The RUBBER AGE

January, 1948

TECHNOLOGY DEPARTMENT

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FEB 6 1948
DETROIT

Soft Carbon

P-33 THERMAX

- It is economical to use P-33 and THERMAX.
- Because they permit of high loading and high quality at the same time—
- Thereby permitting the production of most quality per dollar in many kinds of goods.
- The supply of both P-33 and THERMAX is ample for their full use in this better and more economical compounding.

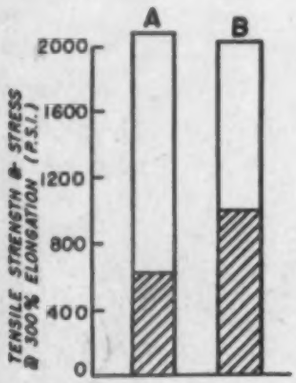
R. T. VANDERBILT CO., INC.

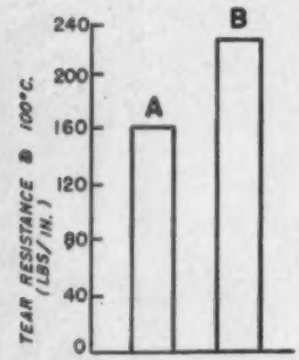
230 PARK AVENUE, NEW YORK 17, N. Y.

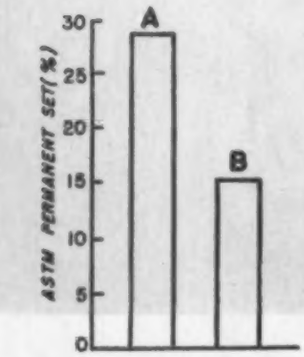
Physical Properties of Test Compounds Cured 10 Minutes @ 298° F.

TEST COMPOUNDS

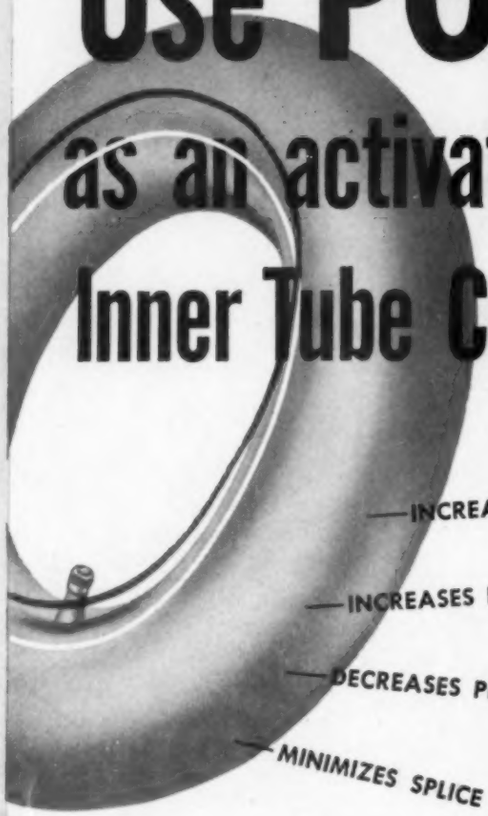
	A	B
GR-I	100.0	100.0
Fine Furnace Black	50.0	50.0
Sulfur	2.0	2.0
Zinc Oxide	5.0	5.0
Magnesium Oxide	3.0	3.0
Stearic Acid	2.0	—
Paraffin	—	1.0
Thiuram M	1.0	—
MBT	0.5	—
Thionex	—	1.0
Polyac	—	0.5
Williams Plasticity	119	128
Williams Recovery	14	58







Use POLYAC as an activator in GR-I Inner Tube Compounds



—INCREASES MODULUS

—INCREASES HOT TEAR RESISTANCE

—DECREASES PERMANENT SET

—MINIMIZES SPLICE DEFECTS

As evidenced by the bar graphs, the physical properties of GR-I inner tubes are substantially improved by Polyac activation of Thionex as compared to a Thiuram M-MBT combination.

In addition to improved vulcanizate properties, Polyac provides a unique stiffening effect in the uncured compound, thus minimizing the tendency of GR-I inner tubes to thin out at the splice.

For detailed suggestions on the use of Polyac in GR-I inner tubes, consult report BL-177. If you would like an extra copy, write E. I. DU PONT DE NEMOURS & CO. (INC.), Rubber Chemicals Division, Wilmington 98, Delaware.

8 p.m. EST, NBC

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

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TECHNOLOGY DEPARTMENT

TWO NEW HYCAR AMERICAN RUBBERS

PUBLIC LIBRARY
FEB 6 - 1948
DETROIT

Hycar OR-25 EP *(Easy Processing)*
Hycar OR-25 NS *(Non-Staining)*

HERE are two new American rubbers, both with superior processing characteristics. Hycar NS and Hycar EP differ only in that a special anti-oxidant has been used in the NS, making it non-staining and non-discoloring. This is an outstanding quality, particularly desirable in the fabrication of light colored products. The new Hycar rubbers have all these advantages over the regular process Hycar OR-25:

1. They band on the processing mill speedily—cut mill mixing time.
2. Better extrusion characteristics—less nerve and less heat build-up.
3. Excellent high temperature mixing.
4. Better fusion and mold flow characteristics.
5. Increased building tack for laminated products, such as frictioned stocks and calendered sheeting.

Both rubbers retain those properties which make Hycar American rubbers so usable for so many products . . . permanent resiliency and superior resistance to oil, abrasion, and aging. Ask your supplier for parts made from Hycar. Or write to Dept. HB-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

YOUR BEST RESOLUTION—FOR 1948!

NO. 1—USE PHILBLACK O . . . it helps you obtain the high quality you want in your rubber products. Philblack O is the **HAF** (high abrasion furnace) black that gives tires long life.

Laboratory data and numerous road tests have proved that this is a profitable resolution to keep . . . that by using Philblack O, your rubber products will have plus-value ruggedness and stamina.

So start now to keep resolution No. 1. . . order Philblack O today and use this newly developed black in your products.

PHILLIPS PETROLEUM COMPANY

Rubber Chemicals Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

Backyard Ocean

. . . a foot deep

Another interesting application of Geon polyvinyl materials

THIS "ocean" is constructed from an unsupported sheet of plastic material made from Geon polyvinyl resins. This plastic offers a combination of properties which could hardly be obtained from any other material. It's waterproof and mildew-proof—and it's smooth, flexible, tough, and long-lasting.

Such qualities make the Geon materials equally suitable for wire insulation or clothesline or upholstery. In fact, no one has yet been able to predict how many practical, money-saving, quality-improving or cost-cutting things Geon can do. This we know: Just as it adds to children's fun and safety in the back yard it can create new benefits to consumers and new markets for manufacturers.

How can you use Geon? It can be extruded, pressure or injection molded, used as a coating for paper or textiles, calendered or cast into sheets or film.

We make no finished products from GEON—or from any of our other raw materials. However, we will be glad to work with you on any special problems of application. We are particularly interested in developing new end uses for these materials. For more information please write Department R-1, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio.

Boltaflex Plastic for Kiddie Pond manufactured by Bolta Products Sales, Inc., Lawrence, Mass.

B. F. Goodrich Chemical Company

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GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

For technical data please write Dept. CB-1

B. F. Goodrich Chemical Company

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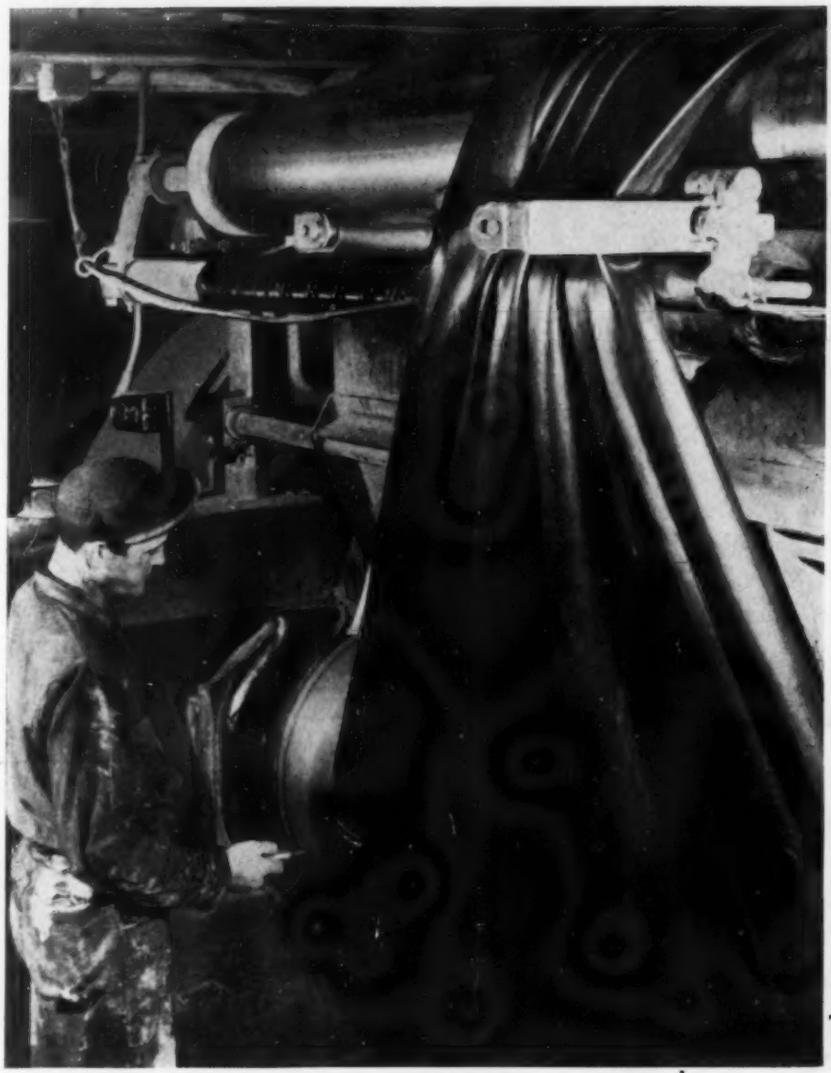
ROSE BUILDING, CLEVELAND 15, OHIO

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

AUTOMATIC
STOCK BLENDER
ATTACHMENT FOR MILLS



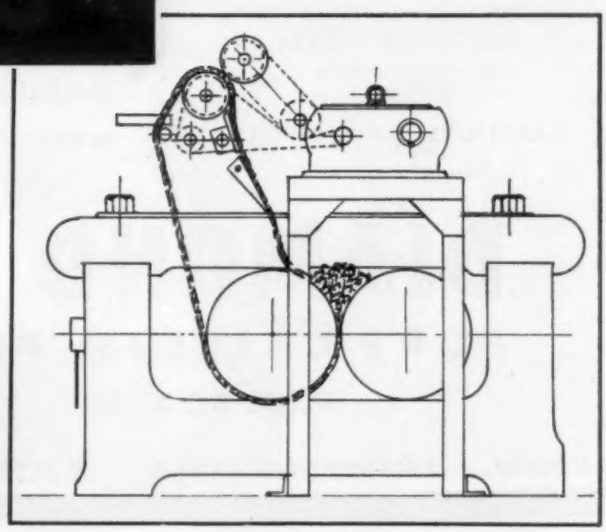
REDUCE TEMPERATURE FASTER

Cooler stocks will permit the addition of accelerators without scorching.

Eliminate the human element and increase the uniformity of batches.

REDUCE LABOR

Eliminate the tiresome labor of hand blending and warm-up. One operator can sometimes operate two or three mills.



INCREASE DISPERSION AND PLASTICITY

The ultimate in dispersion is quickly obtained.

Plasticity speed increased with less heat.

The Akron Standard Mold Co.
Akron — "The Established Measure of Value" — Ohio

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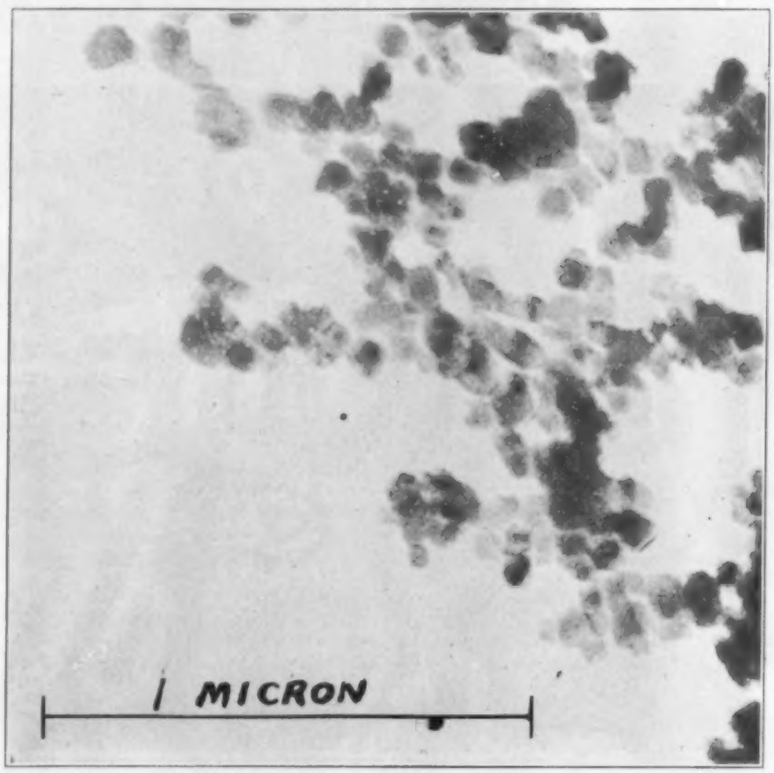
MULTIFEX

PRECIPITATED CALCIUM CARBONATE

(ultra fine particle size)



Electron microscope photograph, 60,000 diameters, shows ultra fine particle size of MULTIFEX

MULTIFEX is used in high loading white and light colored rubber stocks where high tensile strength and high resistance to tear are required.

To obtain maximum properties, MULTIFEX should be used in loadings of 60 to 100 parts per 100 parts of rubber. When used under those conditions, low modulus, high elongation, and excellent flexing properties are secured.

DIAMOND ALKALI CO.

PURE CALCIUM PRODUCTS DIVISION

P. O. BOX 407, PAINESVILLE, OHIO

KALITE **SWANSDOWN BRAND** **MULTIFEX** **SUSPENSO BRAND** **MILLICAL BRAND**

HERE'S a welcome answer to the critical shortage of balata — **PLIOLITE S-6.**

This unique reinforcing agent not only extends the available supply of balata, it actually improves some of its properties — such as cut resistance, click and driving range.

Best of all, **PLIOLITE S-6** can be used in amounts up to 30% of the total formulation, thereby greatly reducing the cost.

PLIOLITE S-6 is available as a powder for your own mixing, or in master batches in whatever synthetic you select. For complete information and sample, write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

GOODYEAR

Pliolite—T.M. The Goodyear Tire & Rubber Company

Technical Bulletin No. 40 — on the Compounding of GR-S with Substantial Loadings of ZINC OXIDE

Blends of Natural Rubber and X-141

(The Isoprene/Styrene Polymer) with 100 Parts of Zinc Oxide

(Refer to Technical Bulletins Nos. 24, 25, 27, 34 and 38)

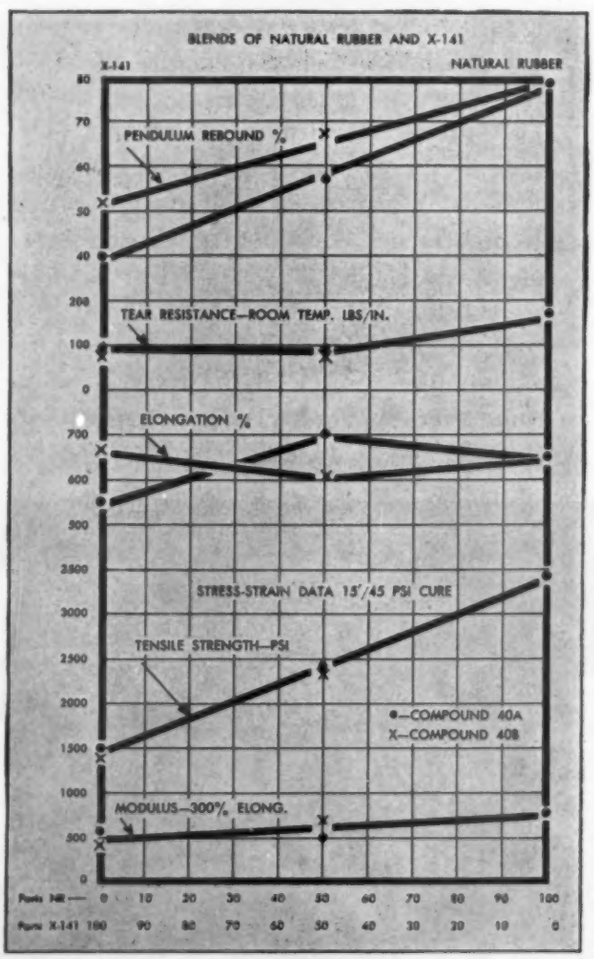
COMPOUND 40		COMPOUND 40A		COMPOUND 40B	
Smoked Sheet	100.0	X-141	100.0	X-141	100.0
Sulfur	3.0	Sulfur	3.5	Sulfur	2.50
MBT	1.0	MBT	2.0	"2MT"	0.75
"Agerite" Powder	1.0	Coumarone-indene Resin	3.0	"808"	0.15
ZINC OXIDE	100.0	E.L.C. Magnesia	5.0	ZINC OXIDE	100.0
		ZINC OXIDE	100.0		

NOTE: Polymer X-141 is available at this time only in pilot plant lots (as polymer XP-65). Requests for samples should be directed to Research and Development Division of the Office of Rubber Reserve.

IN Technical Bulletin No. 38 certain compounding changes were suggested which seemed to offer possibilities of improving the results of the blends with Zinc Oxide. The effect of these changes are reported in this bulletin.

First, the stearic acid was eliminated from the natural rubber compound, since the X-141 already contains an excess of acidic material, and the coumarone-indene resin content was reduced to 3 parts in the X-141 compound (see 40A). These changes resulted in: (1) Increased curing rate for both the natural rubber and blended compounds; (2) Increased modulus at 300% elongation, with corresponding lowering of the elongation; (3) Lowered pendulum rebound, 5% in the case of the natural rubber compound and 3.5% in the 50/50 blend.

Secondly, coumarone-indene resin and E.L.C. magnesia were eliminated from the X-141 compound (see 40B). "2MT"—"808" is the only accelerator combination for GR-S and modifications which we have found to give good results with Zinc Oxide, over a range of cures, in the absence of E.L.C. magnesia and coumarone-indene resin. The results were as follows: considerably higher modulus, lower permanent set, and an improvement in resilience for the 50/50 blend of the order of 7%.


BLENDS OF NATURAL RUBBER AND X-141
X-141
NATURAL RUBBER
PENDULUM REBOUND %
TEAR RESISTANCE—ROOM TEMP. LBS/IN.
ELONGATION %
STRESS-STRAIN DATA 15'/45 PSI CURE
TENSILE STRENGTH—PSI
●—COMPOUND 40A
X—COMPOUND 40B
MODULUS—300% ELONG.
Parts NR— 0 10 20 30 40 50 60 70 80 90 100
Parts X-141 100 90 80 70 60 50 40 30 20 10 0

HORSE HEAD PRODUCTS New Jersey Zinc

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
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What about PHENOLIC RESINS *for compounding* HARD *and* SEMI-HARD *stocks*?

DUREZ RESINS
in the Rubber Industry
Durez phenolic resins have two basic, major uses in the rubber industry—for compounded stocks and solvent-type adhesives. This bulletin contains a brief, simple outline of those uses and of the various Durez resins which are available today. There is, of course, constant advancement in both resin and synthetic rubber development and in the blending of natural and synthetic rubbers. It therefore may be readily assumed that the present applications will expand.
Compounding of hard and semi-hard rubber stocks accounts for the greatest use of Durez resins in the rubber field. These resins are useful with acrylonitrile-butadiene resins (Buna N or GRA type) synthetic rubber, with styrene-butadiene (Buna S or GRS type) synthetic rubber, with natural rubber, with blended styrene-butadiene and natural rubber, and with Neoprene.
Excellent solvent-type adhesives are produced using Durez resins with Buna N, natural rubber, and Neoprene. Durez resins have been successfully used as an adhesive for bonding uncured and cured Buna N stocks to various metals during the molding operation.
Another recent and interesting use is one in which Durez resins have provided considerably increased adhesion between rubber and fabric where they have been used in the pretreatment of nylon and rayon fabrics. This application is not yet widespread but offers excellent possibilities.

New report shows advantages as plasticizers... also end-product benefits

Recent developments indicate that specially formulated phenolic resins have a wide field of usefulness in processing rubber stocks. In all cases they serve as very effective plasticizers. They also contribute to such physical properties of the final stock as reenforcement, hardness, stiffness, abrasion resistance, and heat and chemical resistance, and they improve finish. Conclusions based on recent studies in this field are presented in "Durez Resins in the Rubber Industry," in which the performance of solvent-type resin adhesives is also discussed. We will gladly send one or more copies of this folder for the use of your staff.

For copies of this folder, please address Durez Plastics & Chemicals, Inc., 311 Walck Rd., North Tonawanda, New York.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC RESINS THAT FIT THE JOB

ORE, AIR, WATER, DRILL and *Skill*

...Essential Production Tools
in the Manufacture of ZnO

One of the key men in mining is the drill runner, with a keen eye for pay ore and a knowledge born of long experience for the proper placing of holes to ensure the minimum of time and dynamite consumed.

This photo shows a drillman at work in a stope of one of the St. Joseph Lead Company's zinc mines in upper New York State where ST. JOE lead-free ZINC OXIDES originate. He works 500 to 2,000 feet underground in a year-round average temperature of 60°F. Two hoses connect with his drill. One supplies compressed air, the other dust-preventing water.

After the ore is duly processed, the resulting zinc concentrates are shipped to the Company's smelter at Josephtown, Pa. Here, by our patented Electro-Thermic process, the concentrates are converted into ST. JOE lead-free ZINC OXIDES and shipped to the consuming industries where—by virtue of their uniform high quality—these pigments, in turn, add to the inherent quality of the many products in which they are used.

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE • NEW YORK 17 • ELdorado 5-3200

Plant & Laboratory: Josephtown, Beaver County, Pennsylvania

Can you find

More Than 16 Ounces

in a Pint Can

?

Many manufacturers have . . . especially when the can held a development sample of Flintkote Liquid Products.

They've often found the welcome answer to a troublesome requirement for coating, laminating, saturating, bonding or other fabrication problem.

We, at Flintkote, make a broad line of liquid asphalt, resin and rubber products . . . both in aqueous dispersions and in solvent form. In addition to standard products, we've helped meet many special requirements that called for custom-made materials.

As a result, Flintkote Liquid Products find wide use in many branches of industry. Some are used for rug and carpet backing, others as paper and textile laminants and sizings, curled hair binders, or adhesives.

Chances are, in our standard line . . . or in our research files . . . there's a solution to *your* problem. If not, our technical staff will be glad to work with you, to discover what you need.

A letter outlining your problem will put our complete research, development and manufacturing facilities at your disposal.

FLINTKOTE

Products for Industry

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FLINTKOTE
INDUSTRIAL PRODUCTS

Butaprene NAA IS THE *Preferred Polymer*

FOR FABRIC-REINFORCED, OIL-RESISTANT RUBBER PARTS

You Get:

- ★ Easy Processing
- ★ High Oil Resistance
- ★ Good Building Tack
- ★ No Fabric Breakdown

Easy processing is an outstanding characteristic of *all* the Butaprene polymers. But for fabric-reinforced rubber parts, Butaprene NAA also gives you good building tack *without* fabric breakdown. And you get high resistance to oils and aliphatic and aromatic fuels. It's the ideal elastomer for friction and skim coatings. That's why more and more compounders specify Butaprene NAA for fabric-reinforced diaphragms, gaskets, cups and sheet stock.

For complete information on the Butaprene N polymers — either latices or solids — write Xylos Rubber Company, distributors, Akron 1, Ohio.

FORMULA

Friction Base or Skim Coat	
Butaprene NAA	100
Dibutyl Phthalate	20
Bakelite 4036 Resin	20
Zinc Oxide	5
Stearic Acid	1
Sulfur	2.50
Santocure	1.50
Thionex or Monex	0.25
Precipitated Whiting	10.00
F. T. Black	80.00
	240.25

NORMAL PHYSICAL DATA

Slab Cure 30′ x 312° F.	
Tensile PSI	1210
Elongation %	545
Durometer "A"	54

BUTAPRENE N *by* Firestone

AMERICA'S *most* VERSATILE ELASTOMER

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THE CYCLONE

that keeps America Tire Valve, Cap, Core and Gauge conscious

Schrader advertisements carry into every corner of America, day in and day out, how Schrader Products help give longer tire life—how to get sturdy service down to the last mile built into tires. This great job gives motorists, fleet owners, dealers and jobbers—one and all—the facts of Schrader dependability and wins universal customer and dealer acceptance of Schrader equipped tires and tubes.

#5050 Passenger Tire Gauge

REPLACEABLE Valve Core

STANDARD Valve Cap

1st SEAL

2nd SEAL

CUTAWAY VALVE

Wherever tires roll—wherever they are serviced, the Standard Schrader Valve has also made possible these benefits to the public:

Standardization of
(1) air pressure and inflation connections;
(2) pressure gauging equipment;
(3) replacement parts, stocks and service tools, and the standardization of "know how", through the tremendous advertising cyclone, everywhere tires are serviced.

SCHRADER PRODUCTS Make Tires Last Longer!

Schrader
PRODUCTS
CONTROL THE AIR

A. SCHRADER'S SON, *Division of Scovill Manufacturing Company, Incorporated,* **BROOKLYN 17, NEW YORK**
World's Largest Manufacturer of Tire Valves, Gauges and Accessories

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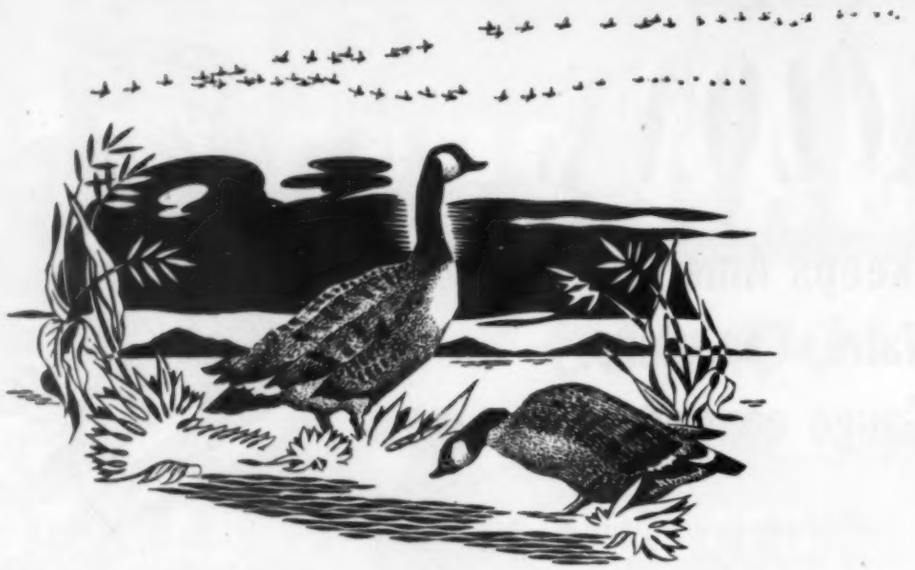

How About Migration?

Staining resulting from Migration in black rubber stocks is out of the question when you use Pelletex Extra Clear carbon black.

That is because Pelletex Ex-Clear, a special purpose SRF black in pelletized form, is made under a precise production control specifically engineered to assure the rubber industry a consistently non-staining black. To guarantee its non-staining qualities Pelletex Ex-Clear is produced on a predetermined schedule to meet the most exacting specifications of the rubber manufacturers.

As a result, Pelletex Ex-Clear may be used with entire confidence in proximity to white or colored rubber or other stock. There is no extractable material to migrate, no staining and discoloration.

Non-staining Pelletex Ex-Clear costs no more than other grades of SRF black, and is immediately available in quantity.

Pelletex Ex-Clear is especially recommended for tire sidewalls, refrigerator gaskets, automotive molded and extruded parts, insulated wire, boots and shoes, rubber coated fabrics.

PELLETEX •

PELLETEX

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GASTEX

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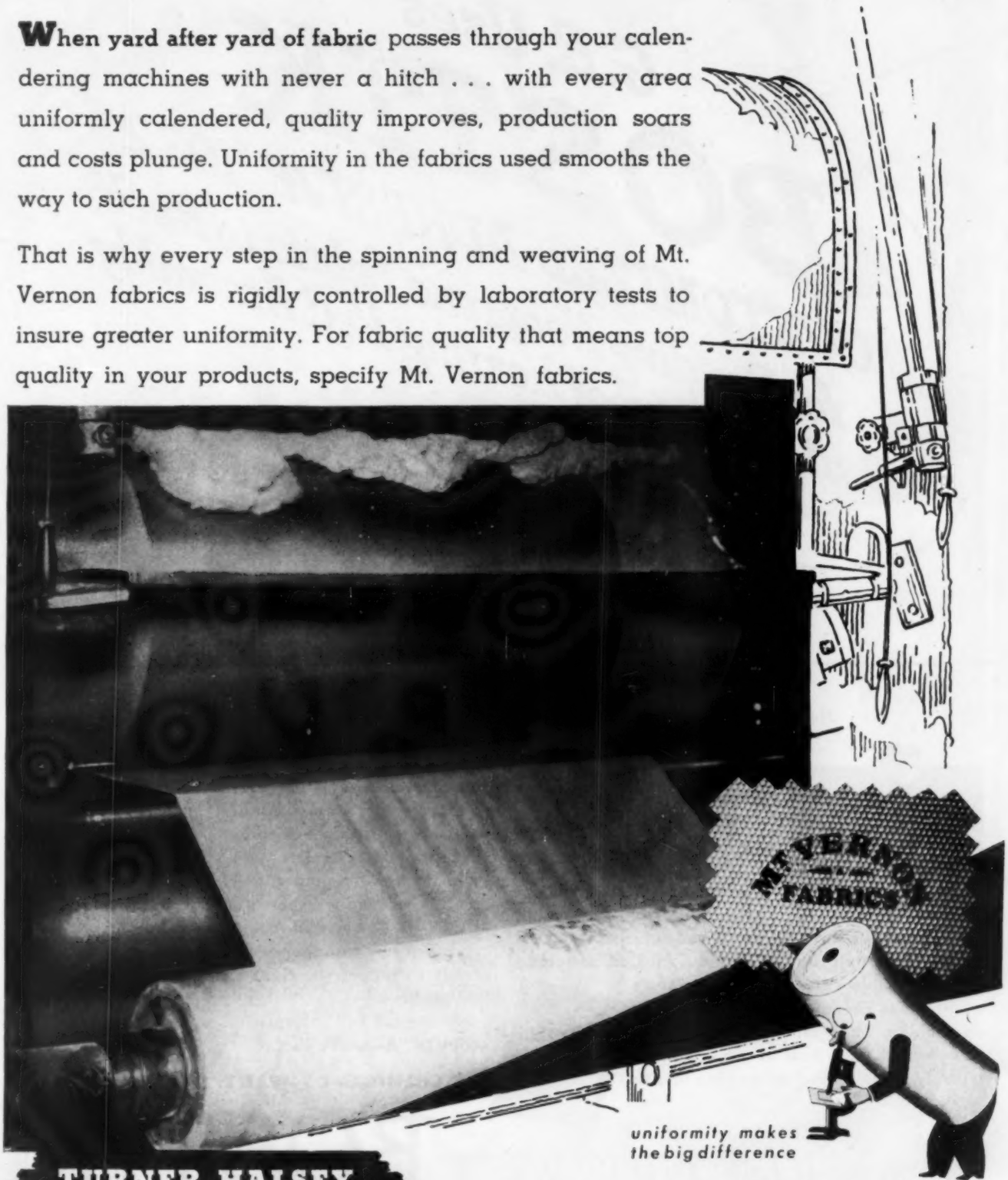
Fabric Uniformity Smooths the Way

When yard after yard of fabric passes through your calendering machines with never a hitch . . . with every area uniformly calendered, quality improves, production soars and costs plunge. Uniformity in the fabrics used smooths the way to such production.

That is why every step in the spinning and weaving of Mt. Vernon fabrics is rigidly controlled by laboratory tests to insure greater uniformity. For fabric quality that means top quality in your products, specify Mt. Vernon fabrics.



uniformity makes the big difference

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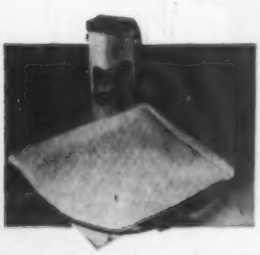
Branch Offices: CHICAGO • ATLANTA • BALTIMORE • BOSTON • LOS ANGELES • AKRON

G.E. Uses BOSTIK CUSTOMIZED ADHESIVE #1032 for Bonding Neoprene Fabric to Itself in Waterproof Heating Pad Assembly

HERE'S HOW:



Say the engineers of the Automatic Blanket and Sun Lamp Division, General Electric Company:

"We apply BOSTIK No. 1032 to the margins of neoprene-coated fabric, and let it dry about three hours. When solvent has evaporated, we install the heating unit, fold the neoprene over, and subject the seam to a pressure of 60 psi at a temperature of 300°F. for one minute. The bonding process is then complete. We use heat in our operation with this cold drying cement in order to get quick initial set, thereby facilitating handling. The following day we run our dielectric tests."

Other important manufacturers, too, are daily finding the value of BOSTIK *Customized* Adhesives — built to do the *particular* job. Whatever materials, or combination of materials, you wish to bond together, call on B B. Remember, there's a BOSTIK *Customized* Adhesive for every bonding need, ready to supply the right answer to even the toughest problem.

Write for full information today . . . ask for your copy of "Adhesive Facts."

BB CHEMICAL COMPANY, CAMBRIDGE, MASS.

"Whatever It Is BOND IT WITH BOSTIK"

Customized Adhesives

One of our several warehouses at Ryus, Kansas

Producing the highest type carbon blacks is United's main purpose, but United's service to its customers is just as important. This program of service includes packaging so that no time is lost in either handling or identification of contents. On the reverse side of this page, you will note the distinct printing of the bags:

SRF blacks packed in black bags printed in RED.

HMF blacks packed in black bags printed in GREEN.

United's service and United's blacks are designed for your needs.

UNITED CARBON COMPANY, INC.

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DESIGNED FOR HANDLING

UNITED BAGS claim attention everywhere with their distinctive colored markings. Each type—SRF, HMF, EPC—is the answer for the exacting compounder and is acclaimed for performance in the millroom and on the road. Standardize on UNITED BLACKS to attain perfection in rubber products.

RESEARCH DIVISION

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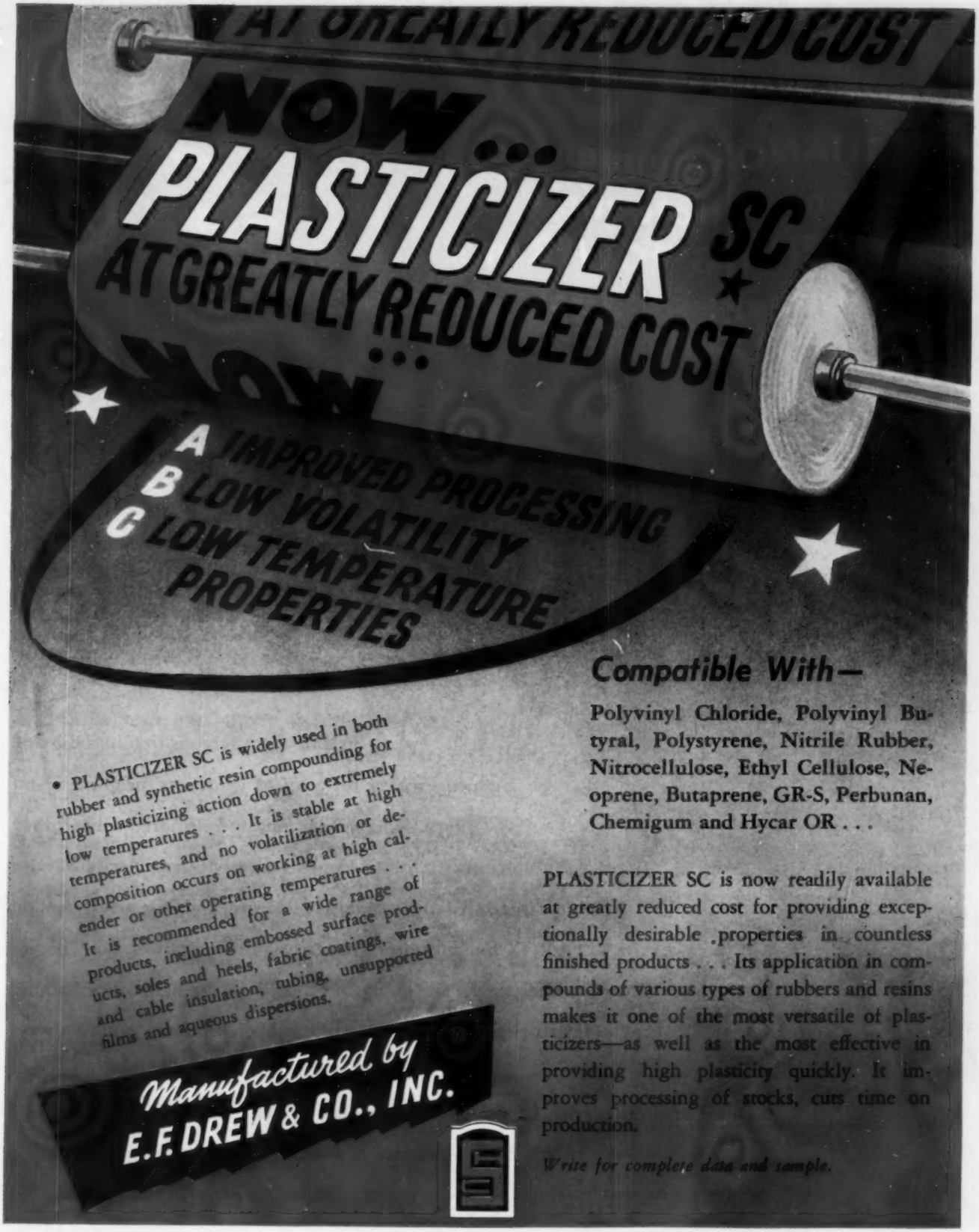
Charleston 27, West Virginia

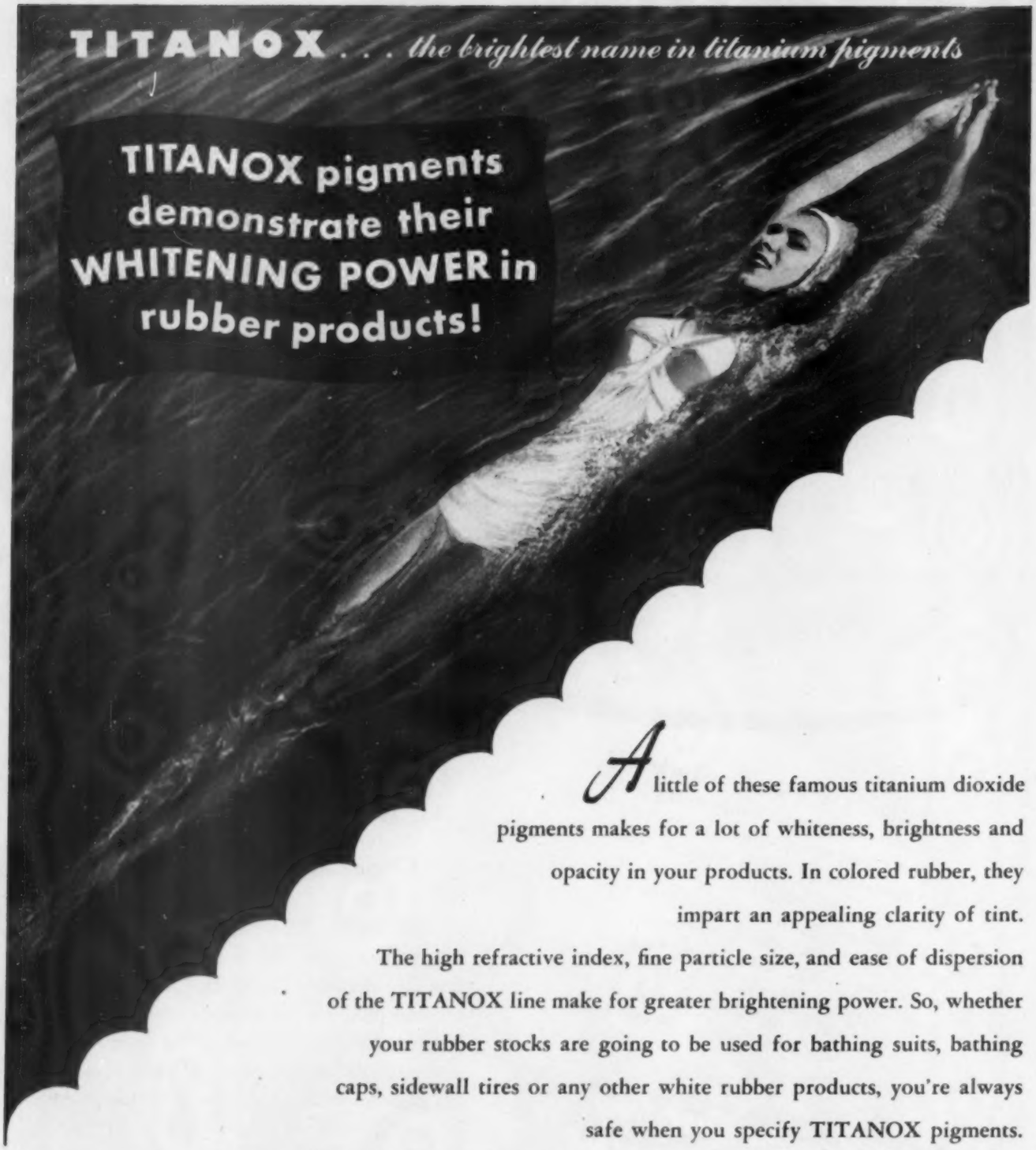

AT GREATLY REDUCED COST
NOW
PLASTICIZER SC
AT GREATLY REDUCED COST
NOW
A IMPROVED PROCESSING
B LOW VOLATILITY
C LOW TEMPERATURE PROPERTIES
• PLASTICIZER SC is widely used in both rubber and synthetic resin compounding for high plasticizing action down to extremely low temperatures . . . It is stable at high temperatures, and no volatilization or decomposition occurs on working at high calender or other operating temperatures . . . It is recommended for a wide range of products, including embossed surface products, soles and heels, fabric coatings, wire and cable insulation, tubing, unsupported films and aqueous dispersions.
Manufactured by
E.F. DREW & CO., INC.
Compatible With—
Polyvinyl Chloride, Polyvinyl Butyral, Polystyrene, Nitrile Rubber, Nitrocellulose, Ethyl Cellulose, Neoprene, Butaprene, GR-S, Perbunan, Chemigum and Hycar OR . . .
PLASTICIZER SC is now readily available at greatly reduced cost for providing exceptionally desirable properties in countless finished products . . . Its application in compounds of various types of rubbers and resins makes it one of the most versatile of plasticizers—as well as the most effective in providing high plasticity quickly. It improves processing of stocks, cuts time on production.
Write for complete data and sample.

HARWICK STANDARD CHEMICAL CO.

AKRON 8, OHIO

Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

TITANOX . . . *the brightest name in titanium pigments*



A little of these famous titanium dioxide pigments makes for a lot of whiteness, brightness and opacity in your products. In colored rubber, they impart an appealing clarity of tint.

The high refractive index, fine particle size, and ease of dispersion of the TITANOX line make for greater brightening power. So, whether your rubber stocks are going to be used for bathing suits, bathing caps, sidewall tires or any other white rubber products, you're always safe when you specify TITANOX pigments.

Our Technical Service Laboratory will be glad to help solve your pigmentation problems. This service is available through our nearest office.

6217

TITANOX

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SOLE SALES AGENT

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BEWARE
OF MAD SHORT CIRCUITS...

Protect Your High-voltage Motors with LIMITAMP CONTROL

Limitamp quickly and easily brings these mad short circuits under control. In less than *one-quarter* cycle, Limitamp's EJ-2 fuses cut off a rise in current from a short, and clear it in one-half cycle—long before the fault current has time to harm the contactor or motor. Your plant's power system needs this prompt handling of fault currents, and you will avoid the risk of costly shutdowns that can result from *one mad short circuit.*

A STARTER AND PROTECTOR IN ONE CABINET

G-E Limitamp control consists of an air-break contactor (the motor starter), and EJ-2 fuses (the short-circuit device). They are mounted in separate compartments of one, all-steel cabinet. Air-break contactors are specially designed for hard duty. Operating experience has proved that they furnish dependable, long-lived, low-cost service with only routine inspection.

Because they operate in air, they eliminate the problem of handling oil. And tip life of air-break contactors is many times that of comparable oil-immersed tips.

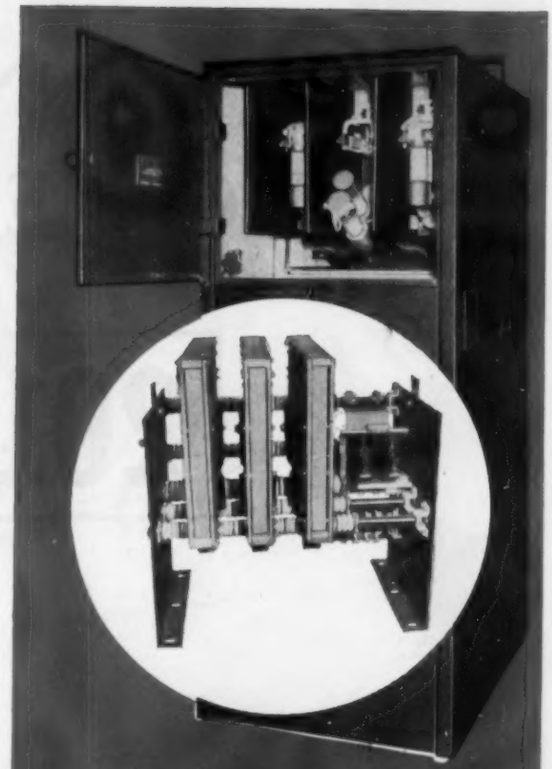
EJ-2 fuses are easy to replace, and they can't wear out. When you install a new fuse, you know your short-circuit protective device is in perfect condition.

OVERLOAD AND UNDERVOLTAGE PROTECTION

Isothermic overload relays, accurately calibrated against actual motor characteristics, guard the motor against overheating from sustained loads or single phasing.

FACTORY-ASSEMBLED CONTROL

Factory-assembled in one cabinet, Limitamp is easy to install, easy to co-ordinate with other control, saves space, and improves the appearance of your plant.



Limitamp control is furnished as a single unit, in groups, or in special enclosures for special operating conditions.

The Trend is to **AIR**

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ANNOUNCES

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Both these grades are readily workable, with good milling, calendering and tubing properties. They mold easily, leaving clean surfaces. Cured physicals are excellent.

These grades are blends of synthetic and natural rubbers, and hence will provide a stable and unlimited source of supply. Write for samples and full details.

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Did you start the New Year right...

by investigating the results obtainable with INDONEX in natural and synthetic rubbers? They have been described in our Bulletin No. 13, while various other specific applications of INDONEX are discussed in the following Circulars.

Check the circulars you want and clip the list to your letterhead. Mail to:

☐ 13-1—Butyl Rubber Compounds ☐ 13-2—Butadiene-Acrylonitrile Copolymer Compounds ☐ 13-3—Neoprene Compounds ☐ 13-4—Tire Carcass Compounds ☐ 13-5—Footwear and Heel Compounds ☐ 13-6—Camel Back ☐ 13-7—Motor Mount and Bumper Compounds ☐ 13-8—Wire Jacket and other Extruded Compounds ☐ 13-9—GR-S Packing Compounds ☐ 13-10—Hose Compounds ☐ 13-11—Hard Rubber Compounds ☐ 13-12—Low Hardness Mechanical Goods ☐ 13-13—Neoprene Mechanical Goods ☐ 13-14—Hycar OR-15 ☐ 13-15—Natural Rubber—Reclaim Mechanical Goods and Carcass Compounds ☐ 13-16—Hard Rubber Compounds

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It was written for you... So write for it

A new booklet, "Witco Pigments in Rubber," has recently been prepared and released by the Witco Technical Service Laboratory.

It was written for you . . . and we believe that the general and specific technical information it contains will prove useful.

The physical properties of some of the most important Witco pigments and their behavior in various natural rubber stocks and blends of natural rubber and GR-S are detailed in this booklet . . . with test data, graphs and bar charts.

Write today for this new Witco booklet and your postman will bring it to you promptly.

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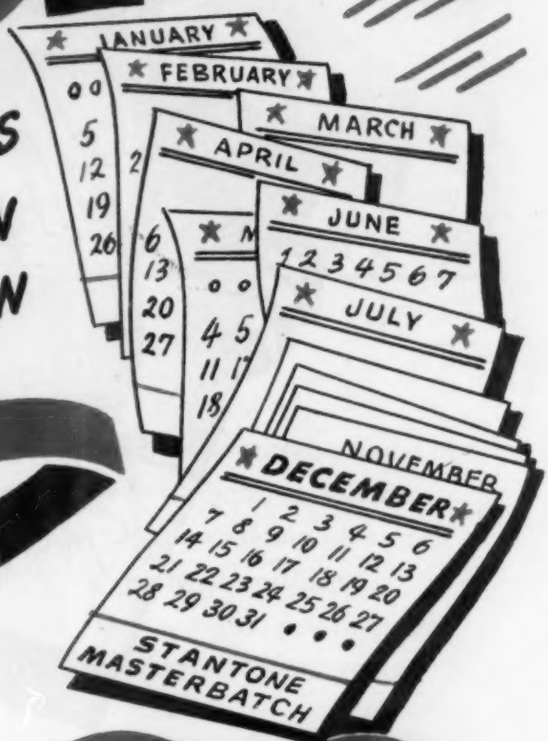
STANTONE MASTERBATCH COLORS

Complete RANGE OF COLORS Always THE SAME IN COLOR INTENSITY YEAR IN AND YEAR OUT....



STANTONE MASTERBATCH presents compounding colors in a new way . . . Concentrated color dispersed in a quickly compatible thermo-plastic medium — standardized in color intensity. With STANTONE MASTERBATCH finished products never vary in color density or hue. Mills may be changed from one color batch to another without intermediate cleaning . . . STANTONE MASTERBATCH Colors save costly experimentation, so often necessary with dry pigments due to natural variations in color intensity. STANTONE MASTERBATCH Colors make color compounding mathematically accurate in matching correct color specifications . . . Many manufacturers today are adopting STANTONE MASTERBATCH COLORS for better coloring, greater color-compounding efficiency and economy.

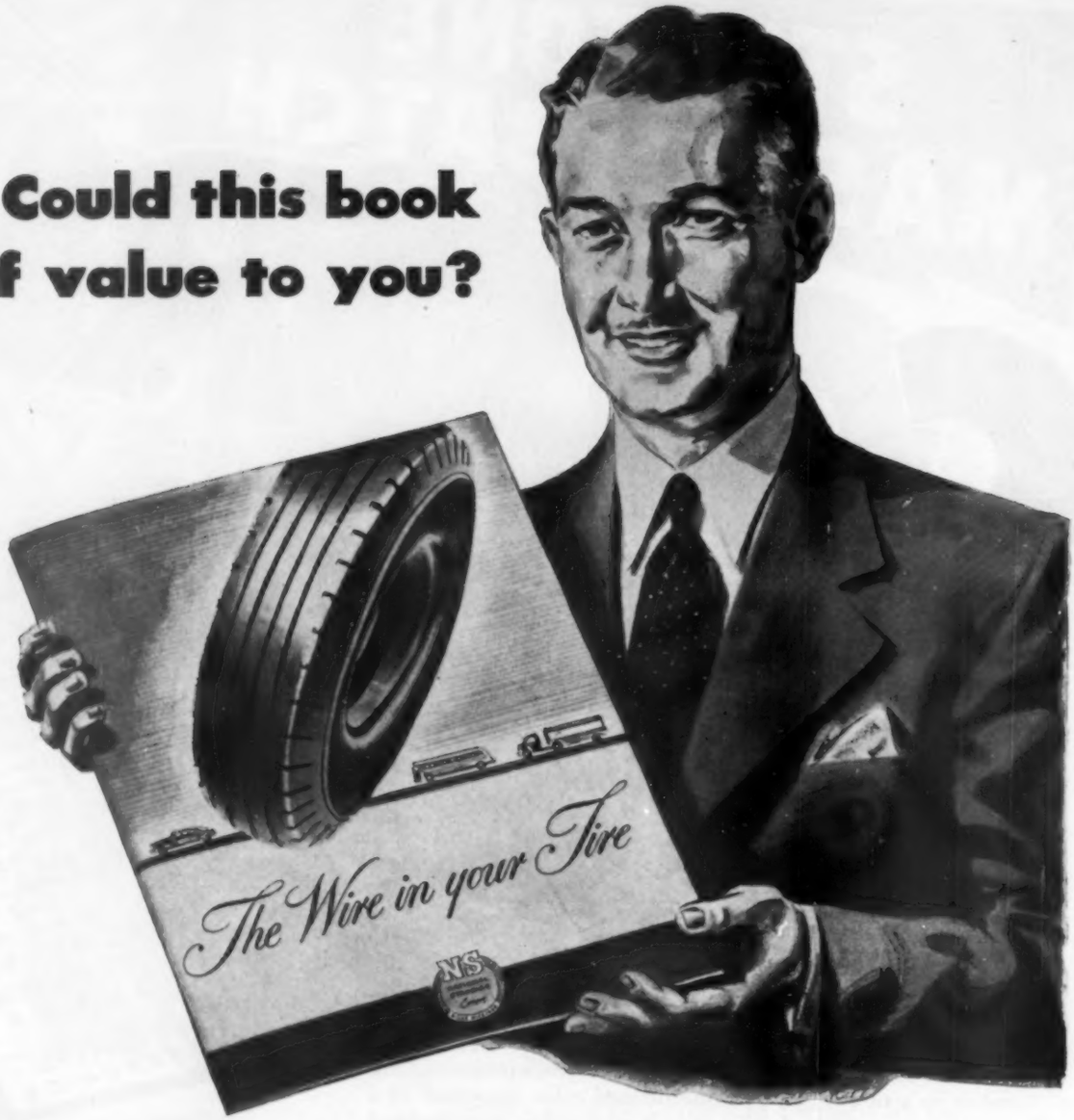
A complete range of colors are now available in MASTERBATCH or dry pigment form . . . Write for complete data on color compounding with STANTONE COLORS — for Rubber and Plastics.

HARWICK STANDARD CHEMICAL CO.

AKRON 8, OHIO

Branches: Boston — Trenton — Chicago — Los Angeles

Could this book be of value to you?



"THE Wire in Your Tire" is a 24-page, richly illustrated book, brief in text. *Not* an engineering treatise, *not* a catalog, it has been prepared particularly for non-technical men in and associated with the rubber industry. However, many engineers tell us that they too have found it interesting and helpful. Its purpose is to give a broader, clearer understanding of the vital functions of steel wire in tire beads . . . a better knowledge of the exacting requirements and varied applications that are a part of the interesting tire-building operations.

You are welcome to a free copy of this book. Just drop us a card or note today. And, after you have gone over "The Wire in Your Tire", if you would like some additional copies for certain friends or associates, you'll find us glad to cooperate . . . as usual. *National-Standard Company, Niles, Mich.*

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With a combination of advantages found in no other red or yellow pigments, Glidden Cadmolith* Colors are now adding new sales appeal and lasting beauty to wallpaper; vinyl coatings, fabrics, paper, printing inks, plastics, enamels, leathers, lacquers, rubber and many other products.

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TESTS SHOW HOW CLOGGED STRAINER SCREENS CHOKE OUTPUT, BOOST HP RATINGS

TAKE a look at the chart at the right. It's a composite of a series of production tests on inner tube stock made on a 10″ rubber strainer at the plant of a well-known tire manufacturer.

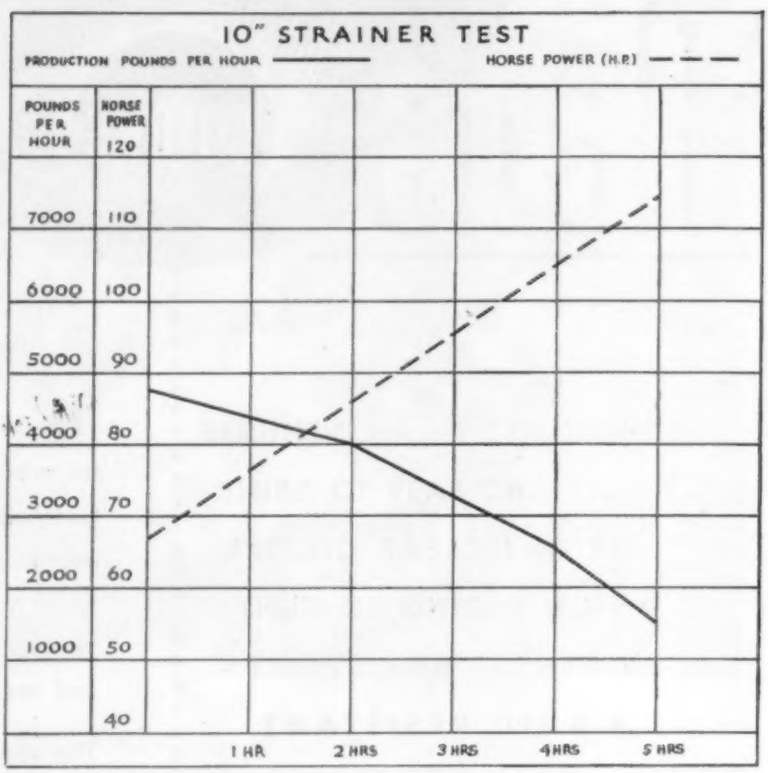
It shows, more clearly than we could ever tell you, how dirty strainer screens reduce output and raise power consumption.

The solid line represents production in pounds per hour; the broken line is horsepower rating.

With clean screens, at the start of the run, note that output is at the rate of approximately 4800 lbs. per hour with about 67 HP required. Then note how at the end of 5 hours, production has been cut to only 1500 lbs., while power consumption has soared to about 115 HP.

Screens must be changed, and changed often, if production is to be kept on an efficient basis. And the key to *frequent* screen changes is *ease* in which they can be changed.

Screen changes that take from five to ten minutes and more with old type strainer heads can now be made in less than a minute.



With the new clamp-type, quick opening NRM strainer head you can convert your present strainer equipment to this great time-saving feature, *and make other savings too.*

Send us a description of your strainer equipment and we will give you complete information on how you can convert to money-saving NRM strainer heads.

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 8, OHIO

NRM

Creative Engineering

California Representative: Sam Kipp, P. O. Box 441, Pasadena 18, Calif.

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Full protection against oxidation?
Full protection against heat deterioration?
... And minimum discoloration?

Then your best anti-oxidant is
FLECTOL* H

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Full resistance to flex cracking?
High resistance to heat deterioration?

Then your best anti-oxidant is
SANTOFLEX* B

Full protection against oxidation?
Extra protection against flex cracking?
Protection against copper deterioration?

Then your best anti-oxidant is
SANTOFLEX BX

Protection against oxidation in uncured stocks?
Extra life for your non-curing cements and tapes?
... And without discoloration?

Then your best anti-oxidant is
SANTOVAR* A

For further information, technical data and samples of these superior anti-oxidants, use the convenient coupon below.

*Reg. U. S. Pat. Off.

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SOLNUS OILS — Well-refined straight mineral oils. Stand up under hard use for long periods of time. Recommended for use in the machine tool industry, in air compressors, certain types of Diesels, etc.

SUNVIS OILS — Are in the same category as Solnus Oils with the difference that, in addition, they meet practically all paraffinic and high V.I. oil specifications.

OCNUS OILS — Low carbon-content oils, containing an additive which minimizes oxidation and gives detergency. Ideal lubricants for internal combustion engines subjected to continuous heavy loads under the most adverse operating conditions.

DYNAVIS OILS — Low pour point inhibited oils which help prevent formation of harmful corrosive and sludge-forming acids. Well-suited for engines fitted with alloy bearings and operated at high temperatures.

SUNTAC OILS — 100% petroleum products which have been treated to increase their adhesiveness. Recommended for general lubrication in all industries where sudden shocks and reversal of loads take place. These oils cling to the parts to be lubricated.

CIRCO OILS — Used for general lubrication of industrial machinery when straight mineral oils are required.

SUNISO REFRIGERATION OILS — Have extremely low pour points and long life stability characteristics. Initially neutral and resistant to formation of detrimental acids under service conditions. The most outstanding oils in the refrigerating and air-conditioning fields.

STEAM CYLINDER OILS — High flash and fire point lubricants for either saturated or superheated steam conditions and for worm gear speed reduction units.

SUN CAR JOURNAL OILS — Dark oils meeting A.A.R. Specifications. For use on railroad cars and waste-packed bearings of railroad equipment.

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SUN MARINE ENGINE OILS — Compounded with special emulsifying agents in order to provide adhesion to and lubrication of working parts in the presence of water. For the lubrication of bearings, eccentrics, cross-heads and various other parts of steam engines.

ROCK DRILL OIL — Heavy-duty adhesive type oil. For use in jack-hammers, stopers and drifters on heavy-duty mining operations.

SUNVIS 900 SERIES TURBINE OILS — High V.I., predominantly paraffinic oils, of uniform 0°F. pour points, containing additives to give high oxidation stability and corrosion resistance under practical operating conditions. Modern oils for turbine and hydraulic systems.

SUN INDUSTRIAL GREASES

SUN CUP GREASES — Water resistant. For grease cup and grease gun application when the service is not severe.

SUN GUN GREASES — Smooth greases made with medium viscosity oil. Stable under pressure in power guns or booster guns.

ADHESIVE PRESSURE GREASES — Won't drip or splash and are excellent lubricants for open gear applications.

SUN DARK PRESSURE-SYSTEM GREASES — For power-driven central grease lubricating systems in heavy industries. Can also be used as a "medium cup grease."

SUN MINE CAR GREASES — Available in several grades. Suitable for both anti-friction bearings and plain bearing cavity-type wheels.

SUN ROLLER BEARING GREASES — For use on electric motors and generators and other high-temperature machinery equipped with ball or roller bearings.

SUN GEAR COMPOUNDS — Black adhesive open gear compounds and wire cable greases. Recommended for open gears on metalworking power presses, mining machinery, old reduction mills, crushers, pump gears, etc.

SUN MINING MACHINE LUBRICANT — Semi-fluid. For use where a light but adhesive type grease is required. Free from separation or decomposition.

SUNOCO TRACTOR ROLLER COMPOUND — For miscellaneous parts of caterpillar or crawler-type tracks. Provides good lubrication with exceptional sealing qualities.

SUN METALWORKING OILS

SUNICUT — Straight or non-emulsifiable transparent cutting oils. Recommended for automatic screw machines and for heavy-duty machining operations.

SUN INDUSTRIAL

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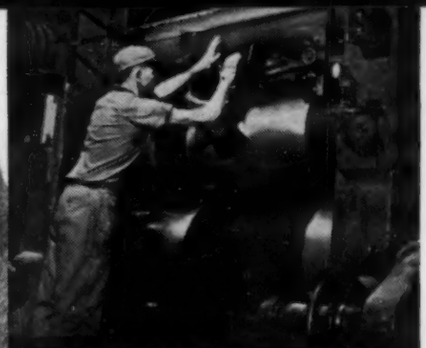
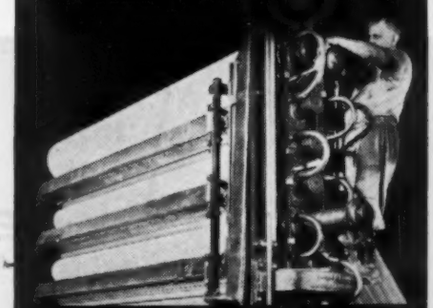
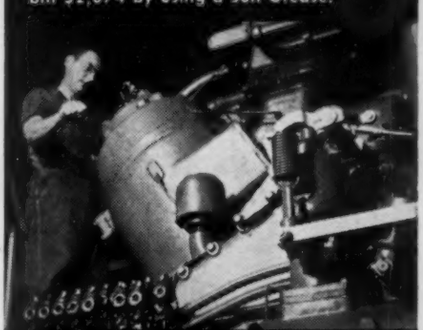


RUBBER MANUFACTURER saved $3,000 a year with a Sun Processing Aid.

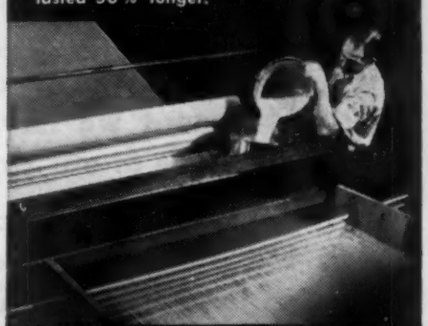
ALUMINUM PARTS MANUFACTURER increased output 43% with Sun Cutting Oil.



PAPER MILL slashed annual lubrication bill $2,874 by using a Sun Grease.



POWER PLANT found Sun Diesel Lubricant lasted 50% longer.



A TEXTILE MILL increased slashing speed 60% by adopting a Sun Processing Oil.

SUNOCO EMULSIFYING CUTTING OIL—A self-emulsifying oil which produces a stable white emulsion when mixed with water. Sunoco is an efficient and economical cooling and lubricating medium for turning, milling, drilling, and other metalworking operations on both ferrous and non-ferrous metals. It is also an excellent grinding coolant.

SUN QUENCHING OILS—Specially refined oils designed to develop maximum physical properties in a wide variety of steels.

SUN TEMPERING OILS—Specially refined oils for tempering steel up to 550°F. Due to their low carbon content and stability under heat, these oils have an unusually long service life.

SUN ROLLING OILS—Straight and emulsifying oils which will permit maximum production in rolling steel, aluminum and brass.

SUN ANTI-RUST COMPOUNDS—Petroleum base oils with chemical additives designed to prevent the rusting and corrosion of steel.

SUN PROCESSING OILS

SUNOTEX TEXTILE OILS—Designed to impart certain additional properties to various forms of fibers during their processing from the fiber state into a manufactured product. All Sunotex textile oils are emulsifiable in water.

SUN COTTON CONDITIONING OILS—Pale mineral oils which condition the cotton. They prevent waste by cutting down excessive amounts of "fly" or fine air-borne particles of lint.

SUN ASBESTOS FIBER CONDITIONING OIL—Used for spraying on the asbestos during processing. Fibers are not so readily damaged or broken down into harmful dust when this product is used.

SUN CORDAGE OILS—Are adaptable in various formulae used by cordage manufacturers. They are selected products which are highly compatible with additives.

CIRCOSOL—2XH (Rubber Processing)—An elasticator and processing aid for GR-S particularly.

CIRCO LIGHT PROCESS OIL (Rubber Processing)—A processing aid and excellent softener for natural rubber, natural rubber reclaims, and neoprene synthetic rubber particularly. Used for GR-S to some extent.

SUNDEX 53 (Rubber Processing)—An inexpensive product suitable for processing GR-S and blends of GR-S and natural rubber. An established outstanding processing aid for footwear rubber stocks.

CIRCOMAR-5AA (Rubber Processing)—A black colored product used in reclaiming natural rubber scrap. Used also as substitute for asphalt fluxes in processing natural and GR-S rubber. Free-flowing at room temperature.

SUN LEATHER OILS—Mineral base leather oils. Used for obtaining the desired tensile strength, proper temper and a controlled moisture content. They maintain a light even color . . . mix well . . . distribute evenly.

SUN MISCELLANEOUS INDUSTRIAL PRODUCTS

SUN SPIRITS—For the thinning of paints, varnishes, and enamels. Also for metal cleaning. This product is a pure water-white petroleum solvent and is free of corrosive sulphur.

SUN WAXES—Used in packaging, sealing, coating, waterproofing and for numerous manufacturing and chemical processes.

PRODUCTS

SUNOCO

Announcing...

a NEW name

The name of this Corporation has been changed

from **P. W. MARTIN GORDON CLAYS, INC.**

To... **SOUTHERN CLAYS, Inc.**

P. W. Martin Gordon Clays, Inc., was for many years the producing unit for the domestic clay business of Moore and Munger, developing and supplying the best grades of clay for the rubber industries. Our policy of direct sales to customers became effective August 1, 1947, and we have decided to adopt a corporate name more descriptive of our products.

Our experienced plant personnel in Georgia has not been changed. Mr. W. H. Shields continues as Sales Manager with Mr. E. W. Schwartz in the rubber industry.

We shall continue to supply the best clays possible for every purpose and to collaborate with our customers to meet their requirements.

Accelerators
Plasticizers
Antioxidants

A Complete Line of Approved Compounding Materials

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

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for hot rubber slabs to prevent adhesion when piled . . . banishes dust nuisance by replacing soapstone, talc . . . prevents sticking during cure of extrusions, tubing when coiled on flat pan . . . excellent lubricant for molds, mandrels, air bags, belt drums, etc. . . . washing, finishing inner tubes, etc.; imparts satiny finish . . . ideal for processing insulated wire, cable . . . truly versatile lubricant for natural, reclaim or synthetic rubbers.

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QUALITY SINCE 1884

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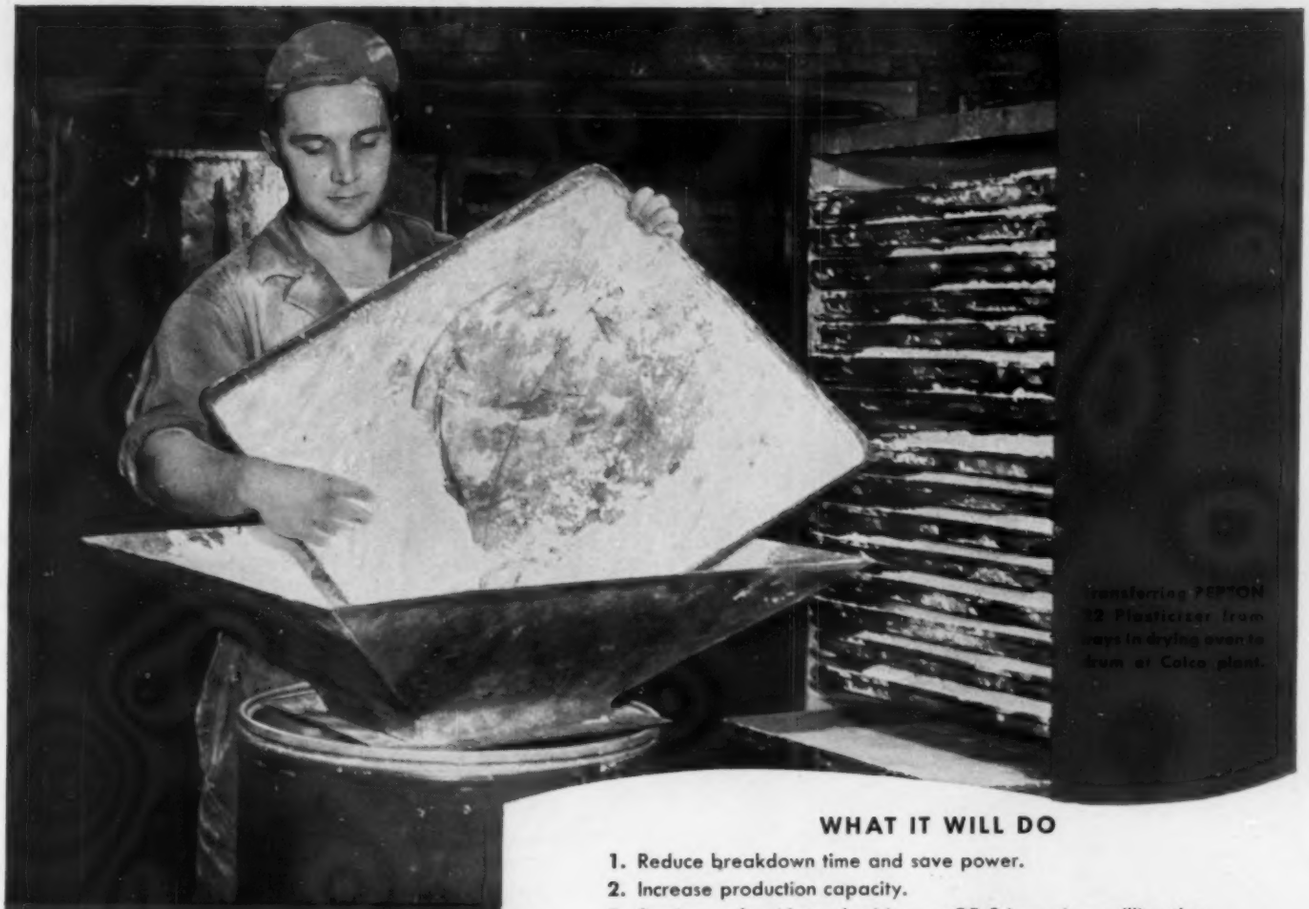

Transferring PEPTON 22 Plasticizer from trays in drying oven to drum at Calco plant.

PEPTON* 22
PLASTICIZER

WHAT IT WILL DO

1. Reduce breakdown time and save power.
2. Increase production capacity.
3. Produce softer Natural rubber or GR-S in a given milling time.
4. Produce soft GR-S with plasticities which show no appreciable change on standing.
5. Control GR-S gel build-up in hot processing.
6. Plasticize reclaimed rubber, mixtures of reclaimed rubber and Natural rubber or GR-S, and also mixtures of Natural rubber and GR-S.
7. Produce softer or more plastic Natural rubber or GR-S mixed stocks in direct mixing.
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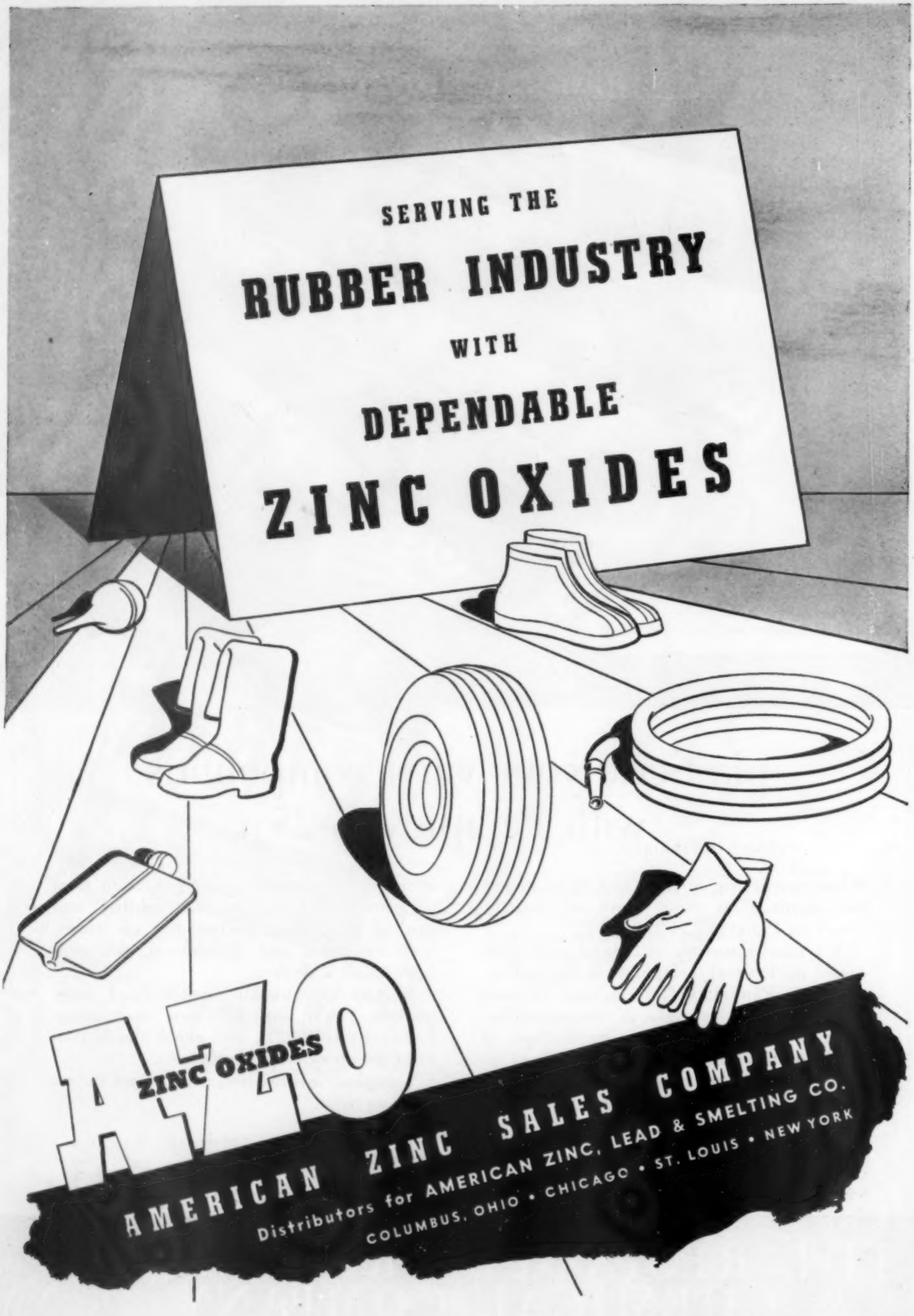
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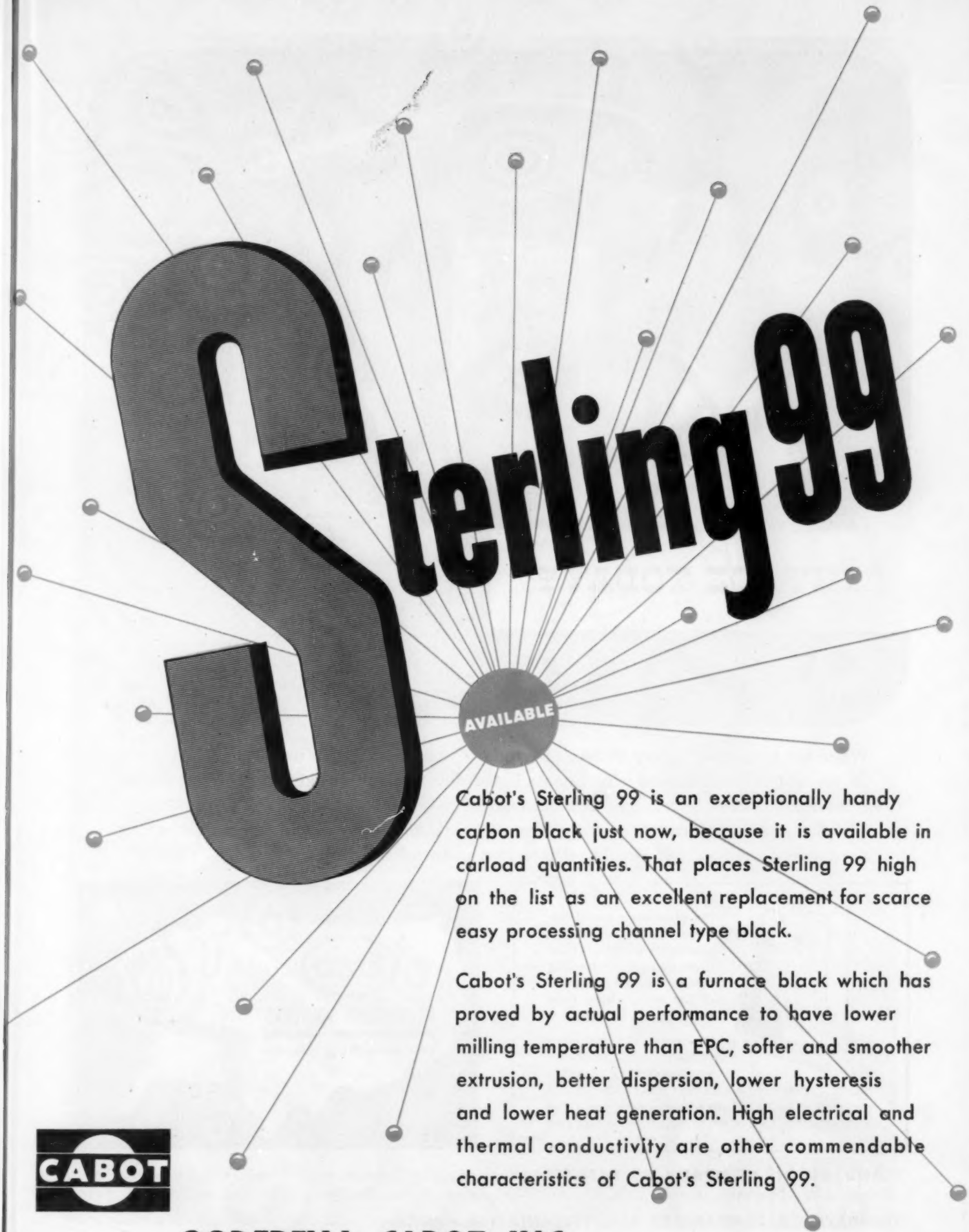

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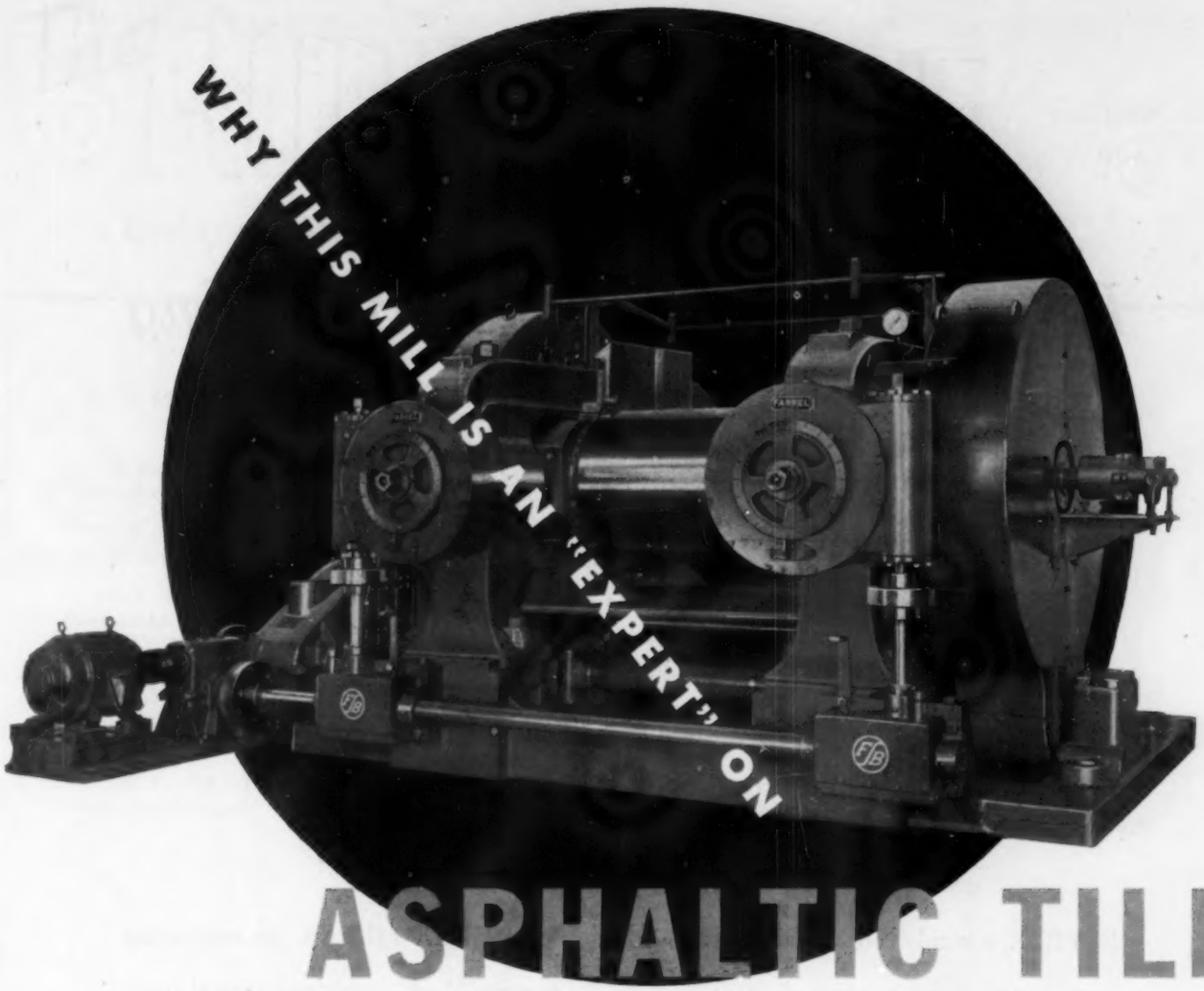

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Precision of Cut-Growth Test for GR-S Vulcanizates

By ROSS E. MORRIS and ROBERT D. FORD

Rubber Laboratory, Mare Island Naval Shipyard, Vallejo, Calif.

When determining the cut-growth resistance of GR-S vulcanizates, it is customary to puncture the surface of the flexing specimen with a sharp or pointed instrument in order to create an initial crack from which the growth can be measured. Two methods have been used to make the initial crack, namely, nicking with a blade and piercing with a needle. The purpose of this investigation was to determine the precision of the test when either of these methods is used. It was found that better precision is obtained when the surface is nicked with a razor blade. It was further found that the greater precision is obtained when the final crack length is used as the criterion instead of crack growth. Final crack length and crack growth showed some degree of dependence on the thickness of the test specimen at the bottom of the groove, but it is doubtful that the close tolerance on thickness established by the A.S.T.M. is justified.

THE laboratory evaluation of GR-S tread stocks for cut-growth resistance is an important test because of the propensity of GR-S items to be deteriorated in service by the rapid growth of accidental cuts. Vila *(1)* was the first investigator to publish data on crack growth in GR-S vulcanizates. He obtained very erratic results in dynamic flexing tests for the number of flexures required until the first cracks appeared, but he found that after the first cracks had appeared their rate of growth was extremely rapid and seemed to be a reproducible phenomenon.

Holt and Knox *(2)* presented an excellent review of the various methods which have been utilized for the laboratory testing of cut growth. These methods employed different procedures for flexing, different specimen shapes, and different procedures for producing the initial cut in the specimen. We are concerned here only with the different procedures for producing the initial cut in the specimen.

Of the methods summarized by Holt and Knox which specifically measure cut growth, eight employed slits produced by a razor blade, knife, scalpel or chisel, and three employed holes made by a needle. The tentative A.S.T.M. specification *(3)* is in the latter group.

The reason for the initial cut is to provide a surface imperfection from which the rate of growth can be measured; it matters little from the standpoint of similarity with service conditions whether the initial cut is a slit or a hole. The selection of the type of surface imperfection should be governed by the effect on the precision (reproducibility) of the test. The main purpose of the work reported here was to determine whether a slit made by a razor blade or a hole made by a needle gives the greater testing precision. Incidental to this determination, the authors also were interested in finding to what extent the rate of crack growth is influenced by the thickness of the specimen at the bottom of the groove.

Preparation of Specimens

The specimens for the flexing test were the De Mattia type specified by the A.S.T.M. *(3)*. The specimens were prepared from the W.P.B. GR-S tread stock recipe, as follows:

GR-S	100.0
Wyex (EPC)	50.0
Zinc oxide	5.0
BRT No. 7	5.0
Captax	1.5
Sulfur	2.0

Note: The opinions or assertations in this article are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval service at large.

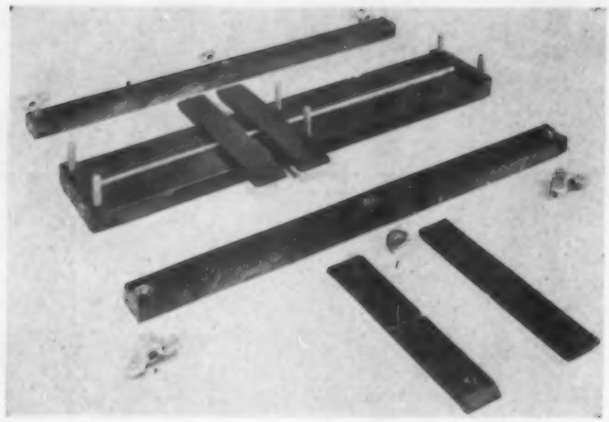

FIG. 1—Jig for positioning specimens in grips of flexing machine, unassembled.

The mixing, processing, curing, conditioning and testing were done in such a manner as to introduce a minimum of variation between specimens. The details of these steps follow:

Mixing and Processing: All comparable tests were performed on specimens obtained from a single 10x20-inch mill batch. The stock was calendered at 0.040 inch thickness 16 to 26 hours before curing. Preforms were prepared by plying up 8 layers of the calendered stock and cutting strips ⅞ inch wide and about 6 inches long, with the calender grain running lengthwise. The weight of the preforms was adjusted to 112 to 116% of the weight of the molded specimen.

Curing and Conditioning: The specimens were cured for 30 minutes at 310° F. in a 6-cavity mold and were cooled in water immediately after removing from the mold. The minimum thickness of the specimens in the groove was about 0.15 inch, and the maximum variation in this value for specimens in the same series was 0.008 inch. This variation is larger than the maximum variation of 0.003 inch permitted by the A.S.T.M. specification *(3)*. The specimens were conditioned in the dark at 82° F. ± 5° for at least one week before testing.

Testing: The intentionally variable features of the testing were the type of cut made at the bottom of the groove in the specimen and the extent of flexing. These features will be discussed in the subsequent sections. The constant features of the testing were the temperature, the speed of the flexing machine, and the manner

FIG. 2—Positioning jig, assembled.

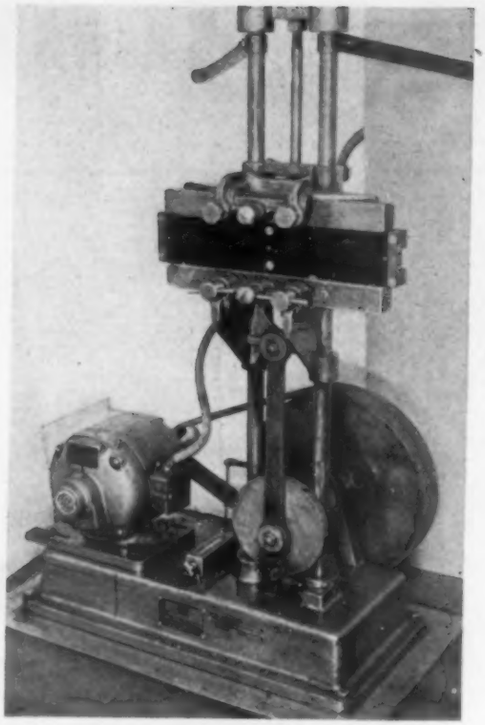

FIG. 3—Jig holding specimens in position between grips of flexing machine.

of installing the specimens in the jaws of the machine. The air temperature was maintained at 82° F. ± 5° and the rate of flexing was 300 cycles per minute. The thickness of the specimens at the bottom of the groove was determined with a dial micrometer having a hemispherical foot with a 1/16-inch radius.

A jig was used to help position the specimens evenly in the grips of the machine as suggested in the A.S.T.M. specification. This jig, which was made from strips of phenolic aldehyde resin, is shown unassembled in Figure 1 and assembled with specimens in Figure 2. The jig holding the specimens in position between the grips of the flexing machine is shown in Figure 3. The clamped specimens after removal of the jig are shown in Figure 4. Only 10 specimens are shown in the photographs for clarity, although 12 specimens were always tested together.

Analysis of Data: The experimental data were examined for reproducibility using the accepted criteria of standard deviation and coefficient variation.

$$\text{Standard deviation} = \sqrt{\frac{\Sigma d^2}{n}}$$

where d is the deviation of each measurement from the arithmetic mean of all the measurements in the series, and n is the number of measurements in the series.

$$\text{Coefficient of variation} = \frac{\text{Stan. dev.} \times 100}{\text{Av. Measurement}}$$

The smaller the standard deviation and coefficient of variation, the better is the reproducibility of the test.

Preliminary Tests

The preliminary tests were performed to evaluate the precisions obtained when the surface imperfection

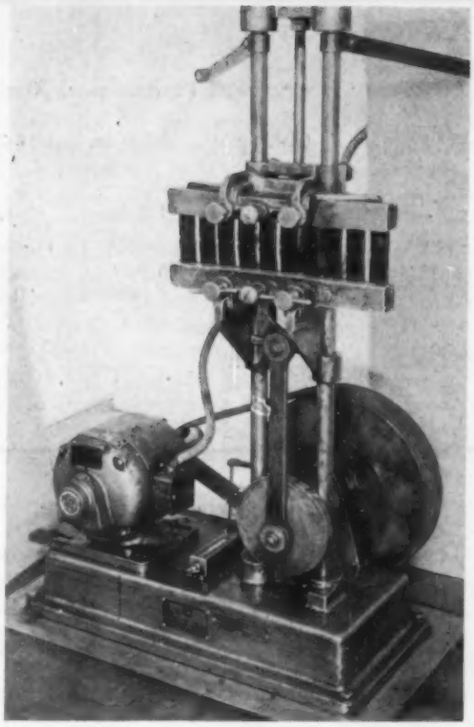

FIG. 4—Specimens in flexing machine after removal of jig.

consisted of (1) a razor blade cut, (2) a partial penetration of a needle, and (3) a full penetration of a needle. In every case, a total of 24 specimens were tested in two runs of 12 each. Each group of 12 specimens comprised the specimens from two moldings. Other details of the preliminary tests are given below.

Tests Using Razor Blade

Series A—The specimen was bent back on itself as shown in Figure 5 and a nick made in the bottom center of the groove, lengthwise with the groove. The nick was cut 1/16-inch deep and ⅛-inch long. The exact length of the nick was determined with a measuring microscope. The flexing machine was adjusted so that during each stroke the grips approached each other to a distance of 1¾ inches and separated to a distance of 3 inches. After 50,000 flexing cycles the width of the nick was again determined with a measuring microscope.

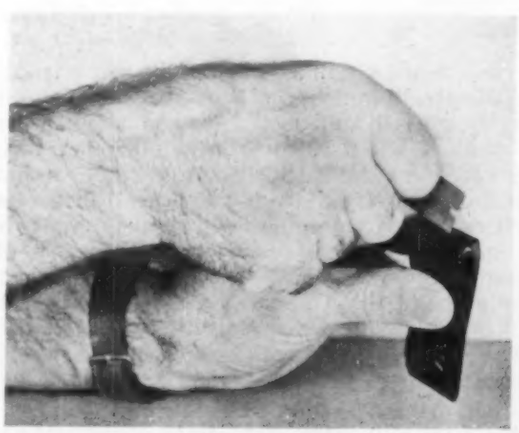

FIG. 5—Procedure for nicking specimens with razor blade.

FIG. 6—Arrangement for obtaining partial penetration of needle.

Series B—The procedure was the same as the foregoing except for the extent of flexing and the number of flexes. The extent of flexing was increased by adjusting the machine so that during each stroke the grips approached each other to a distance of ¾ inch and separated to a distance of 3 inches. This adjustment of the machine is in accordance with the A.S.T.M. specification. The number of flexes was reduced to 15,000.

Tests Using Partial Penetration of Needle

Series C—A needle jig sold by the Precision Scientific Company was modified to obtain a partial penetration of the needle into the specimen. The half-round positioning bar on the table of the jig was removed and the plunger was fitted with a square collar provided with a set screw. The thickness of the specimen at the bottom center of the groove was determined and the collar was adjusted to obtain 0.050-inch penetration of the point of the needle.

FIG. 7—Arrangement for obtaining full penetration of needle.

TABLE I—SUMMARY OF RESULTS OF PRELIMINARY TESTS

Surface Imperfection	Razor Blade Nick		0.05-Inch Penetration of Needle		Full Penetration of Needle		
Series (24 specimens in each)	A	B	C	D	E	F	G*
Diameter of Needle.....	———	———	0.040 in.	0.049 in.	0.040 in.	0.049 in.	0.049 in.
Minimum Distance between Grips during Cycle (max. distance always 3 in.).....	1¾ in.	¾ in.	1¾ in.	¾ in.	1¾ in.	1¾ in.	¾ in.
Number of Flexes	50,000	15,000	50,000	15,000	50,000	50,000	15,000
Average Final Crack Length	0.4361 in.	0.4533 in.	0.2139 in.	0.3318 in.	0.3828 in.	0.2864 in.	0.3798 in.
Standard Deviation	0.0498 in.	0.0524 in.	0.0562 in.	0.0585 in.	0.0832 in.	0.1008 in.	0.0725 in.
Coefficient of Variation.....	11.4%	11.6%	26.3%	17.6%	21.7%	35.2%	19.1%
Average Final Crack Growth	0.3127 in.	0.3414 in.	———	———	———	———	———
Standard Deviation	0.0482 in.	0.0501 in.	———	———	———	———	———
Coefficient of Variation.....	15.4%	14.7%	———	———	———	———	———

* Present A.S.T.M.

The diameter of the needle was 0.040 inch. The specimen was placed on the table of the jig with the grooved side up, and the plunger pressed down to drive the point of the needle into the bottom center of the groove to a depth of 0.050 inch. This operation is shown in Figure 6. The prepared specimens were clamped in the flexing machine, which was adjusted so that during each stroke the grips approached each other to a distance of 1¾ inches and separated to a distance of 3 inches. After 50,000 flexing cycles the length of the cut was determined with a measuring microscope.

Series D—The procedure was the same as for Series C with the following exceptions: (1) the diameter of the needle was 0.049 inch, (2) the grips approached each other to ¾ inch and separated to 3 inches, and (3) the specimens were flexed 15,000 cycles. This procedure was in agreement with the A.S.T.M. specification except for partial penetration of the needle instead of full penetration.

Tests Using Full Penetration of Needle

Series E—The Precision Scientific needle jig without modification was used. The diameter of the needle was 0.040 inch. The specimen was placed on the table of the jig with the grooved side down over the half-round positioning bar, and the plunger pressed down to drive the needle through the bottom center of the groove to full penetration. This operation is shown in Figure 7. The prepared specimens were clamped in the flexing machine and the machine adjusted so that the grips approached each other to a distance of 1¾ inches and separated to a distance of 3 inches. The length of the cut was measured after 50,000 cycles.

Series F—The procedure was the same as for Series E except that the diameter of the needle was 0.049 inch. This diameter is in compliance with the A.S.T.M. specification.

Series G—The procedure was the same as for Series E with the following exceptions: (1) the diameter of the needle was 0.049 inch, (2) the grips approached each other to ¾ inch and separated to 3 inches, and (3) the specimens were flexed 15,000 cycles. These changes brought the procedure into complete agreement with the A.S.T.M. specification. *This is the only series in the preliminary tests which was performed entirely in accordance with the A.S.T.M. specification.*

Results of Preliminary Tests

The results of the preliminary tests are summarized in Table I. The data obtained from the tests of specimens nicked with the razor blade were analyzed in two ways. The first way involved only the measurement of the final length of the crack; no account was taken of the initial length of the nick. The second way involved the crack growth and therefore took into account both of these measurements.

The coefficients of variation in Table I clearly show that the razor blade nick gave better precision than partial penetration or full penetration of the needles. Furthermore, the best precision was obtained when final crack length of the razor blade nick was used as a criterion instead of final crack growth, i. e., when no account was taken of the original length of the nick. This surprising result is not readily explained since the original length of the nick varied somewhat between specimens. The data for the original length of the nick in the 24 specimens were as follows: average value 0.1108 inch, standard deviation 0.0108 inch, coefficient of variation 9.7%.

It is easier to understand why the razor blade nick gave greater precision than partial penetration or full penetration by a needle. It was noted that a crack, growing from a hole made by a needle, often started at an angle to the axis of the groove in the specimen and then straightened out parallel with the groove. The final crack length was measured only in the direction of the groove so that the wandering of the crack in other directions was not taken into account. In contrast, the nick made by the razor blade grew only in the direction of the groove.

Final Tests

In view of these findings, it was thought advisable to make a more thorough check of the precision of the A.S.T.M. method and of the method using the razor blade nick. It was decided to include another variation of the needle method in this program since, in spite of the previous results, it would appear that the needle method should give more uniform results than the razor blade method because of the greater uniformity of the initial cut. The new variation of the needle method was the same as the A.S.T.M method except that an 0.025-inch diameter needle was used. This was found to be the smallest diameter needle which would not break when pushed through the specimen.

In each of the final tests, a total of 48 specimens were tested in four runs of 12 each. Each group of 12 specimens comprised the specimens from four moldings. Other details of the final tests are given below.

Test Using Razor Blade

Series H—Same as Series B.

Test Using Full Penetration of Needle

Series I—Same as Series G. This is the only series in the final tests which was performed entirely in accordance with the A.S.T.M. specification.

Series J—Same as Series G except that the needle diameter was 0.025 inch.

The results of the final tests are summarized in Table II. These data confirm the previous conclusions regarding the greater precision, first, of the razor blade nick test over the full needle penetration test, and second, of the razor blade nick test using final crack length as the criterion over the same test using final crack growth as the criterion. It is surprising to note, however, that the coefficients of variation in these final tests were about one half of those in the preliminary tests which used the same procedure.

Use of the 0.025-inch diameter needle reduced the precision of the test to a marked degree. There seems to be nothing that can be done to improve the precision of the test using needle penetration.

Correlation With Thickness

As pointed out previously, the current A.S.T.M. specification requires that the minimum thickness in the groove of test specimens being compared shall not differ more than 0.0015 inch from the average of these thicknesses. The authors were interested in determining the correlation between the minimum thickness in the groove and final crack length or crack growth in order to determine whether or not this close tolerance is necessary.

Statistical theory offers a means of evaluating correlation in terms of the correlation coefficient. There are several expressions for the correlation, but probably the simplest is the following *(4)*:

$$\text{Coefficient of Correlation} = \frac{\Sigma x y}{\eta \sigma_1 \sigma_2}$$

where x is the deviation of items in series X from their arithmetic mean,
y is the deviation of items in series Y from their arithmetic mean,
σ_1 is the standard deviation of X items,
σ_2 is the standard deviation of Y items, and
η is the number of paired items.

The coefficient of correlation can assume any value between —1 and +1 inclusive. It is usually considered that no correlation exists unless the coefficient of variation is less than —0.5 or greater than +0.5.

Table II—Summary of Results of Final Tests

Surface Imperfection	Razor Blade Nick *	Full Penetration of Needle	
Series (48 specimens in each)	H	I †	J
Diameter of Needle	———	0.049 in.	0.025 in.
Average Final Crack Length	0.5876 in.	0.5655 in.	0.4108 in.
Standard Deviation	0.0362 in.	0.0614 in.	0.1125 in.
Coefficient of Variation	6.2%	10.9%	27.4%
Average Final Crack Growth	0.4747 in.	———	———
Standard Deviation	0.0337 in.	———	———
Coefficient of Variation	7.1%	———	———

* Average initial nick length, 0.1127 inch
Standard deviation of nick length, 0.0117 inch
Coefficient of variation, 10.4%
† Present A.S.T.M.

Table III—Coefficients of Correlation of Crack Length and Crack Growth with Specimen Thickness

Surface Imperfection	Razor Blade Nick	Full Penetration of Needle	
Series	H	I *	J
Needle Diameter, inch	——	0.049	0.025
Specimen Thickness at Groove:			
Average in Series, inch	0.156	0.156	0.157
Maximum in Series, inch	0.159	0.158	0.160
Minimum in Series, inch	0.153	0.153	0.152
Maximum Deviation from Average, inch	0.003	0.003	0.005
Coefficient of Correlation of Specimen Thickness with			
Final Crack Length	0.36	0.28	0.07
Crack Growth	0.43	——	——

* A.S.T.M.

The final test results offered for this analysis four sets of data, each consisting of 48 paired items (crack growth or crack length versus minimum thickness). The coefficients of correlation based on these four sets of data were calculated and are given in Table III.

The coefficients in Table III show that final crack length and crack growth were affected by the thickness of the specimen at the bottom of the groove in a positive manner, i. e., as the thickness increased, the rate of crack growth increased. This is logical, since with the same degree of bending, the stress in the rubber on the outside of the bend would be greater for thicker specimens.

The magnitude of the coefficients indicates that while there was correlation between thickness of the specimen and the rate of crack growth, the degree of correlation was far from perfect. For that reason the authors believe that the range of thicknesses used in this study was not excessive, and that the A.S.T.M. requirement for a tolerance of only plus or minus 0.0015 inch in the thickness of the specimens being compared is too rigid.

Conclusions

The following conclusions were reached as a result of this work:

1. Cut growth resistance can be measured with greater precision if the initial imperfection in the rubber specimen is a nick made by a razor blade rather than a hole caused by the partial or complete penetration of a needle.
2. Changing the needle diameter from 0.049 inch to 0.025 inch reduces the precision of the test when complete penetration is used.
3. Greater precision is obtained when using the razor blade nick if the criterion is final crack length instead of crack growth.
4. The rate of crack growth is correlated to the thickness of the specimen at the bottom of the groove, but the correlation is not significant enough to justify a tolerance of only plus or minus 0.0015 inch as called for in the present A.S.T.M. specification.

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Use of Direct-Fired Warm Air Heaters Aids Production of Rubber Latex Toys

VERSATILITY of direct-fired warm air heaters in the new plant of Rempel Manufacturing, Inc., in Akron, permits the use of the units as combination space and process heaters during the winter and as air circulators during the summer, according to the Dravo Corporation, of Pittsburgh, Penna., manufacturers of the heaters.

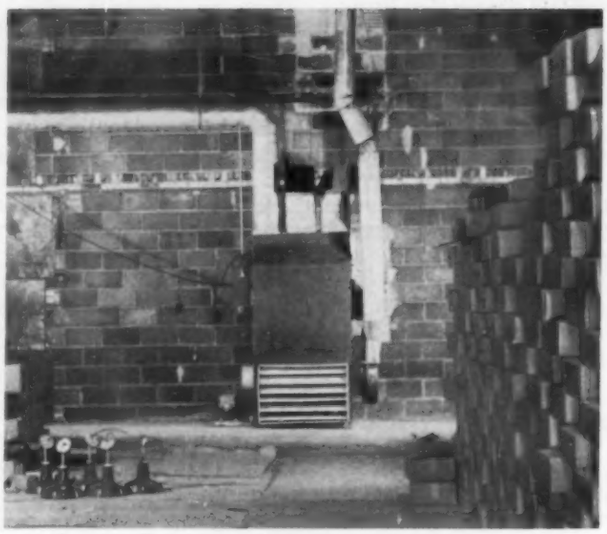
In the building occupied by Rempel, two Dravo Counterflo gas-fired space heaters were installed early last year. One is of 750,000 Btu capacity and the other of 400,000 Btu. Operating on the principle of "working level" recirculation of warm air, the units establish and maintain comfortable temperatures for Rempel's employees. At the same time, they aid in the firm's production of molded rubber toys. Rempel's protected method of manufacturing rubber toys in shapes, not always possible to achieve by dipping or pressing, involves the use of special molds into which rubber latex is poured.

Warm air being discharged at a velocity of some 2000 ft. per minute from the Dravo heater in the main working area of the plant also aids the Rempel process. In the summer, the Dravo unit is operated without heat to circulate air in the same manner.

After the toys have been removed from the molds, they are vulcanized and painted, either manually or with a spray gun. This process permits most economical production of oddly shaped rubber toys.

Rempel's new plant is 192 ft. long and 60 ft. wide. One story high, the walls are 12 in. tile and the floor is 5 in. concrete. The larger Dravo heater serves an area containing 7,200 sq. ft. while the smaller maintains design temperature in the remaining 4,320 sq. ft.

Although the roof is 18 ft. high, it was found that the units established a comfort zone in the working area with a minimum heat loss through the roof because of the effective method of heat distribution. Cold air is drawn from the floor into the base of the heater through louvered openings. It is passed first over two banks of economizer tubes through which the gases of combustion travel en-route to the vent stack, then over a stainless steel combustion chamber and is finally discharged about eight feet above the floor into the working area. The larger heater has four discharge outlets, while the smaller has three.



View of the 400,000-Btu Dravo heater with three discharge nozzles, one of which is connected to a duct. The vent stack can be seen at the right. This unit maintains comfortable working conditions in an area of 4,320 square feet.

A section of the manufacturing area in Rempel's plant is shown above. The duct system is used to remove paint fumes. The entire plant is heated by two direct-fired units operating on the principle of "working level" recirculation of warm air.

Drafts are virtually non-existent because the rate of flow of cool air along the floor to the heater is low. Temperature of the air entering the heater is raised about 80 degrees as it sweeps the economizer tubes and combustion chamber. Combustion efficiency of 80 to 85 per cent is achieved resulting in fuel economies.

Because of the location of the overhead discharge nozzles above workers' heads warm air is distributed uniformly throughout the entire plant area thereby eliminating any worker complaints of annoying drafts or overheated gusts of air.

Occupying a minimum amount of space, the two heaters that perform a dual job—space and process heating—in Rempel's plant, were installed by three simple operations. Only the fuel, power and vent stack connections had to be made. The Dravo Direct-Fired Heaters eliminate the need for a boiler room or steam pipes and air ducts. Furthermore, no full time attendant is required.

Since delivery of heat is almost instantaneous when the heaters are started, the thermostats are set at lower temperatures during non-working hours with the assurance that design temperatures will be restored quickly when needed. In milder weather, the heaters can be turned off completely at night.

Preparation, Properties and Applications of Geon Paste Resin

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THE search for simplicity in processing and fabricating techniques is a task of all industries. To reach a goal, newly evolved materials, products or processes must be gained without loss of quality or rate of production. These facts, while not new, are nevertheless frequently overlooked. Applied to the plastics industry, they should operate continuously if better and less expensive materials are to be offered to a public that is trying to retake the lost ground in the shift from a "sellers" to a "buyers" market.

A development of importance in the vinyl plastics field, that provides simplicity in processing, is a true polyvinyl chloride paste forming resin recently announced by the B. F. Goodrich Chemical Co. This new thermoplastic, called Geon Paste Resin, is most significant in that it is easily dispersed in plasticizer, and with a minimum of equipment, may be molded, cast, coated or dipped. It eliminates the necessity for heavy and expensive mixing equipment and will produce the same type products commonly made by calendering, solution and latex coatings. The whole concept of Geon paste resin can be exemplified by briefly pointing out the marked differentiation in processing techniques between Geon latex, solution and paste coatings.

Geon latex is a dispersion of very small particles of vinyl chloride resin in water. Plasticization is accomplished by adding a concentrated emulsion of plasticizer to the latex. In coating applications, the water phase of the dispersion must first be evaporated, after which the deposited plasticizer and resin particles are fused by exposure to a temperature of 300° F. Evaporation requires heating equipment of varying size depending upon the application.

In solution coating with Geon resins, a solvent such as methyl ethyl ketone is added to the resin together with a plasticizer. Due to limited solubility, it is necessary to use large quantities of solvent and there is danger of the solution gelling, which makes application very difficult. Solvents are definite fire hazards and their high cost requires expensive recovery equipment.

Geon paste formulation obviates several objections inherent in the latex and solution systems. With this recent development, it is possible to disperse Geon resin in plasticizer, and then with simple processing equipment and proper heat treatment, produce an article possessing the same excellent qualities of the resin mixed and applied on conventional equipment to equivalent resin-plasticizer ratios. Success of this method for formulating paste resin depends upon the fact that solvation or plasticization of the resin is extremely slow at room temperature. As a result, it is possible, when operating at room temperature, to blend resin and plasticizer with the plasticizer serving as a vehicle to carry the resin. At room temperature the plasticizer remains as a separate liquid or external lubricant for the resin. However, upon heating, plasticization takes place with the liquid plasticizer being absorbed by the resin. This fusion of resin and plasticizer forms a tough, solid and useful flexible mass.

In conventional processes where vinyls are calendered, extruded, or molded, heat is necessary during at least two operations. The resin is first plasticized on a hot mill and then calendered by hot rolls or extruded through a hot die. In the paste system, heat is necessary once and must be sufficient to drive the plasticizer into the resin. This necessitates heating the mass to 325-350° F. for the fluxing or fusion of the resin and plasticizer. The physical properties of the resultant articles are dependent on how successful this heating process is completed. Since there is no chemical reaction involved, it means that the mass is simply brought to the desired temperature.

Geon paste resin is a free flowing white powder with a specific gravity of 1.40. Particle size ranges from 1 to 30 microns with a mean diameter of 8 to 10 microns. With proper wet or dry grinding, the agglomerates may be broken down to a 1 to 5 micron range which is optimum for most paste formulations. In some cases, it may not be necessary to grind the resin at all.

Formulation

B. F. Goodrich Chemical Company has developed a series of paste-forming resins varying somewhat in formulating and processing methods and also in the final physical properties obtained. In order to describe a paste-forming system in the most simplified way, the new Geon 100 x 210 has been selected for description in this article. The properties of this resin are shown in Table I.

Geon paste resin is applicable to two distinct formulating methods. The first of these is a straight resin-plasticizer mixture, where the resin is merely dispersed in plasticizer by simple stirring. The other involves the addition of a volatile diluent to the resin-plasticizer mixture. This latter method makes possible a wide range of hardness in finished products.

Resin-Plasticizer System: Paste formulation using

TABLE I — TYPICAL PROPERTIES OF GEON 100-X-210 WITH VARYING AMOUNTS OF RESIN AND PLASTICIZER

Geon 100-X-210	45	50	55	60	65	70
Dioctyl Pthalate	55	50	45	40	35	30
Hardness (after fusion) (Durometer A)	50	55	65	70	80	90
Initial Viscosity* (Centipoise)	1,000	2,900	3,000	3,500	7,500	87,000

* A single reading taken with a Synchro-Lectric Viscosimeter.

the resin-plasticizer system is quite simple. The best dispersion is obtained by adding the resin to the plasticizer and, for some applications, this is accomplished by simply stirring. An ink mill employing only a few passes may also be used to give an excellent dispersion. Care must be exercised however to cool the rolls as heat will thicken the paste mixture. For coatings that are not subsequently embossed, it is advisable, if simple mixing is used, to dry-grind the resin. This grinding is not necessary for molding applications.

The fabricator should never lose sight of the concept for which a paste resin is designed, that is, a fluid and easily applied thermoplastic material. Thus, the choice of plasticizer is extremely important. Selection should be limited to those that give the formulation a low viscosity and a slow rate of solvent action at room temperature, and when heat is applied, plasticize the resin rapidly to produce a solid fused mass. Other properties to be considered when choosing a plasticizer are low temperature flexibility, volatility, odor, color and compatibility. Recommended plasticizers are dioctyl phthalate, trioctyl phosphate and di-n-octyl phthalate.

Blends of plasticizers such as dioctyl phthalate and triethylene glycol esters have proven useful in lowering the viscosity and reducing thixotropy. There are many more combinations that may be used. It is simply a matter of keeping in mind the properties desired in the finished product.

Resin-Plasticizer-Diluent: Paste formulations employing a diluent are also relatively simple. The principle advantage of this system is that the diluent provides additional volume and retains fluidity during fabrication even with low plasticizer content. Thus, it is possible with this system to gain varying degrees of hardness in the finished product. Straight chain aliphatics just above the gasoline range in molecular weight are recommended as diluents because they do not swell the resins, thereby maintaining low viscosity and increased storage life. The evaporation rate with this type of diluent is rapid enough so that none will remain after the resin has been fused. Small quantities of active solvents such as ketones and esters may be added to the mixture as an aid in stabilizing the mix. These ingredients also help in the fusing process by softening the resin for the plasticizer.

The choice of plasticizer for the diluent system is very important for, as in the resin-plasticizer system, it must act as the dispersant as well as the plasticizer. Dioctyl phthalate is commonly used; however, other plasticizers deserve consideration. Blending of plasticizers in this system is also desirable because frequently the dispersing qualities may be controlled in this manner.

Coating fabric with Geon paste resin using a laboratory knife coater.

General Formulating Practice: Like all organic material, Geon resin tends to decompose to some extent on exposure to high temperatures. Consideration should be given to the use of heat stabilizers such as SN or V-1-N with paste resin to reduce the possibility of heat breakdown during the fusion.

Paste formulations, unless controlled, exhibit unusual flow properties. The extent to which thixotropy (structural buildup on standing and breakdown on mixing) concerns a formulator depends upon the end-use of the mixture. For coating, casting or dipping, it is not a desirable condition and must be controlled. This can be done in the resin-plasticizer system by using a blend of various plasticizers. In the resin-plasticizer diluent system, thixotropy may be controlled by the use of active solvents for the resin such as methyl-isobutyl ketone. These materials serve as dispersants for the resin and aid the plasticizer in giving a stable dispersion. This active solvent also serves to lower the fusion temperature somewhat and improves the film forming properties of the paste resin. Because the active solvents cause the resin to swell slightly as the paste is heated, plasticization take place more easily.

Other ingredients added to Geon paste resin include colors, fillers and stabilizers such as lead carbonate or lead silicate. An unlimited choice of colors, from the delicate pastels to the rich bright hues, may be used in paste formulations. Titanium dioxide, lead titanate and basic lead carbonate are all acceptable as base or covering pigments.

The choice of color pigments is generally governed by the stability of the shade with respect to heat and light. Colors that have been satisfactory for conventional Geon compounding also show good results with Geon paste resin. They are anthraquinone and indanthrene blues, yellows and orange; phthalocyanine blues and greens; and the cadmium and lithol reds.

Fillers such as clay or whiting should have as low an oil absorption factor as possible. The maximum amount of plasticizer is then available for lubrication and dispersion of the resin.

All pigments should be added to the paste mix as dispersions in plasticizer. This should be particularly true in simple mixing when using the resin-plasticizer formulation, because stirring will not disperse the loading agent or color sufficiently. In the resin - plasticizer diluent system the mixing efficiency of the ink roll or ball mill will be enhanced by adding the pigments as dispersions 2-3 hours before the milling is complete.

Applications

Applications for Geon paste resin cover the fields of low pressure and cast molding, spread and dip coating. Products can be made equivalent to and be of the same quality as those commonly made by calendering, molding, solution and latex coating. Laboratory experiments have shown excellent reproductions of surface, good stability and no residual stress or strains when using paste material.

On the basis of present trends, paste technology gives every indication of competing for and capturing a substantial part of the vinyl sheeting business. Solution coating is an old industry and has not only had the disadvantage of expensive and dangerous solvents but has been encumbered with the fact that substantial coatings

have always required a great many passes through the coating machine. The new paste process permits laying down of films or coatings up to twenty mils thick in one operation. Therefore, the range of films that can be produced by paste processes can be varied to include thin films useful in good packaging, films of medium gauge for raincoats, shower curtains, aprons, etc., and heavy films practical for upholstery and luggage. Moreover, these films respond to embossing techniques in the same way as those produced by any other process. Single pass operation will be a powerful stimulus in converting conventional methods to this new and economical technique.

Heretofore, in molding polyvinyl materials, it has been necessary to use either injection or compression molding machinery. Articles molded from Geon paste resin exhibit the same excellent service qualities as those obtained from conventional resins. Since they are thermoplastic and will deform with heat, products that will undergo high heat, are not suggested. Gaskets, shoe soling, printing rolls and novelty items are only a few of the articles that can be molded with this new low pressure technique. Children's toys, including exquisitely molded dolls, can be made by paste molding processes. Never before have the properties of vinyl resins been within the scope of such applications in which the desirable features of tear strength, nontoxicity and permanence are so necessary.

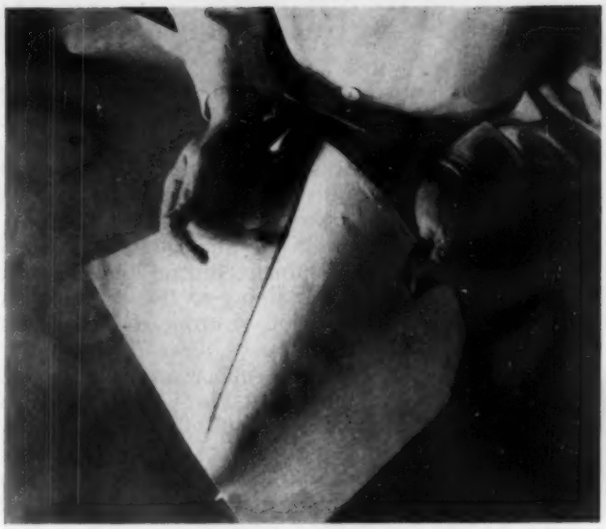
The electrical industry has for years been searching for a material with which to fill the voids in the cores of large electrical cable. These voids have always been troublesome because of ionization difficulties that, during a moment of electrical stress, might quickly cause failure of the cable. Geon paste formulations have shown promise in this type of use because they can be so readily forced into the interstices of cables and fused in place.

The use of Geon paste resin in dipping applications are extremely interesting. Using the resin-plasticizer formulation, it is possible to obtain a very thick coating with a single dip. Dipping is aided by preheating the article to be coated. Preheating sets a thick layer of paste next to the dipped surface. The quantity of paste compound picked up by a dipped article can be controlled by the viscosity of the formulation and by the amount of heat added to the dipped part. If a thin coating is desired, it is not necessary to preheat for enough material clings to the article to give a smooth continuous film. Large potential volume is indicated for dipping with paste materials for such applications as gloves, toys, dish drainers, plating racks and thin-walled electrical insulations.

Processing

Processing with Geon paste resin follows the same pattern of simplicity as exhibited in the technique of formulation. Mixing and grinding is commonly accomplished through the use of a pebble mill. Flint pebbles or porcelain balls are preferable as a grinding media. Steel balls may be used if care is exercised to prevent iron contamination, since iron causes discoloration and may initiate breakdown of the base resin.

Certain precautions must be followed during grinding, mixing and handling operations. Heat build-up should be kept at a minimum, since heat from any source causes a marked increase in the viscosity of a paste formulation. Care should be exercised to cool the mixture while stirring or grinding. Storage of the mix prior to use should be in a cool place away from radiators and steam pipes, for the same reason.



Removal of cast Geon paste film from paper carrier after fusion.

The casting of thin films one to four mils in thickness is a relatively simple operation. The paste is coated on a temporary support such as a stainless steel belt, fused with heat, and the resultant film stripped from the carrier. Casting films with pastes enables a processor to control the gauge of film to very close tolerances, down to one ten-thousandth of an inch. This is a decided advantage which is becoming more and more important in view of recent progress in electronic heat sealing, a process that requires extremely close gauge tolerance of the vinyl film, for fabricating finished products.

Low pressure molding techniques formerly confined to the casting or pouring resins, that could only be condensed or polymerized, are now possible with paste formulation. A fabricator is now able to get the desirable properties of a polyvinyl material without expensive molds and machinery of conventional methods. Since a Geon paste resin formulation is a liquid and will fuse and knit together with application of heat, it is a simple operation to obtain molded polyvinyl materials without applying pressure. With the resin-plasticizer system, there is practically no shrinkage in the mold because of the absence of a chemical reaction or the loss of volatiles. Liquid plasticizers have a small degree of volatility, hence their small shrinkage.

The use of the resin-plasticizer diluent system for impregnations is an extremely interesting application. Here too, conventional techniques and equipment can be used. That is, the formulation can be applied to a base material in a bath, the excess removed with rolls, and the resin fused at a temperature of 325-350° F.

Conclusion

Paste type resins respond to fundamentally simple formulating and processing methods. They can be converted to plastic products which have excellent physical and chemical properties. Paste technology has already demonstrated that it can produce superior products to those made by older conventional methods. This can be clearly seen in the unsupported vinyl sheeting and film markets where paste resins have achieved high strength, freedom from residual strain, uniform properties in all directions and extremely close gauge tolerances—all this with sound economy.

Status of the Rubber Manufacturing Industry in Europe

As reported in our December, 1947, issue, the principal speaker at the meeting of the Ontario Rubber Section of the Chemical Institute of Canada held in Toronto on December 9, 1947, was R. E. Hatsch, manager, sales and technical service division, Polymer Corporation, Ltd. Mr. Hatsch discussed some of the impressions of conditions in Europe received during an eight-month tour of that continent he made during the past year. Some of his comments pertaining to the rubber manufacturing industries of various European countries are reproduced below:

Norway: Norway's normal rubber consumption is 3,000 tons per year. One group, Askim Gummivarefabrik, consumes about 80% and is the only tire producer in the country. Askim also produces footwear and mechanical goods. Their technical staff is sound and progressive. They have a technical information agreement with the Dayton Rubber Co. in the United States. The industry in general is very interested in the development of man-made rubbers and some of the companies are using limited quantities of GR-S on a regular basis. Butyl tubes are being produced experimentally and tested.

Sweden: The big four U. S. companies control the market, either with direct subsidiaries or in partnership with Swedish firms. The only independent large firm is Tretorn, a footwear producer. Their methods are progressive and their equipment very good. They produce excellent footwear, most of it molded. Most of the plants are expanding their production substantially to take care of the market formerly supplied by Germany. Sweden's total rubber consumption is approximately 7,000 tons per year. Some man-made rubber is being used on a regular basis, especially by the mechanical goods and wire and cable people.

Finland: The rubber industry is controlled by the Finske Gummifabrik, whose two plants consume 85% of Finland's rubber consumption of 3,000 tons per year. Their parent plant in Tammerfors (northern Finland) is comparatively small but is being enlarged and modernized. This firm has used man-made rubber and is interested in the various types. Unfortunately, however, Finland has no dollars and Russia is now supplying her with buna from the German plants.

Denmark: The rubber industry is limited but active. None of the firms produce auto tires on more than an experimental scale. Bicycle tires and tubes are the biggest items since Copenhagen alone has more than 500,000 cyclists. Of the total rubber consumption of approximately 2,000 tons per year, Dansk Galoche and Schionning & Arve consume approximately 75%. Wire and cable firms account for most of the rest. Production is limited pretty well to domestic demand.

Holland: The Dutch rubber manufacturing industry was never particularly strong. Most of the production has been limited to bicycle tires, tubes and other products. Just recently, however, Vredestein, affiliated with Goodrich, have started production of auto tires. Michelin have now built a small plant and will produce cycle tires and tubes. Many of the plants were completely or partially destroyed during the war. The others lost much of their equipment. Most of the plants are being modernized. Some GR-S is being used and Butyl experimental work is being carried on in both tube and wire and cable industry.

Belgium: The rubber industry is dominated by the Englebert company, which consumes approximately 35% of the total consumption of 7,000 tons per year. Two French firms, Michelin and Bergougnan, also have plants, and Pirelli operates a general rubber products plant. A number of the smaller consumers, plus several large wire and cable companies, make up the total. Most of the plants are pretty old.

France: The rubber industry consumed more than 58,000 tons in 1946, and of this total 29,000 tons was man-made rubber. Total consumption in 1947 was expected to be nearly 75,000 tons, of which about 13,000 tons will be man-made rubber. 1948 consumption is expected to increase by 10%. The largest consumer is the Michelin Company, which produces tires and tubes only. Other large consumers are Dunlop, Kleber (formerly Goodrich), Bergougnan, Englebert, Hutchinson and Renault. These firms consume approximately 58,000 tons per year. The remaining 22,000 tons are consumed by about 100 smaller firms and the wire and cable industry. The industry in general is quite well equipped and most secretive about its activities. The technical staffs of some of the firms are among the finest in the world.

Switzerland: The rubber industry is comparatively small. The largest plant is the Firestone plant near Basel, which is the largest producer of auto tires and tubes. This plant uses approximately 40% of Switzerland's total consumption of 3,500 tons per year. Several other plants produce a variety of mechanical goods, bicycle tires and tubes, and footwear. The Swiss plants, generally speaking, are very modern and well run. Both GR-S and Butyl have been used and substantial quantities of man-made rubber are still used.

Italy: The rubber industry consists of three large companies, the largest of which is the Pirelli Company. This firm, manufacturing all types of rubber articles, including wire and cable, uses approximately 60% of Italy's consumption of approximately 20,000 tons per year. Of this total about 20% was GR-S in 1947. In addition to the parent Pirelli Company, there are a great number of smaller firms, directly or indirectly controlled by the Pirelli group. The second largest company is a subsidiary of the French Michelin concern, and the third is a subsidiary of the French Hutchinson concern, manufacturing only mechanical goods, footwear, bicycle tires and tubes. The smaller companies total some 150. Most of these possess only two mills and curing presses.

Czechoslovakia: The total rubber hydrocarbon consumption is approximately 15,000 tons per year. All the major rubber factories are nationalized. The Bata factory at Zlin, which manufactures all types of rubber articles, consumes approximately 60% of the total. The old Michelin plant, now nationalized under the name of Mitas, manufactures tires and tubes and consumes 12%. Four other plants consume most of the remainder. Purchases of raw materials are all made through the nationalized export-import group, which in the case of rubber is Kotva, the former Bata export-import agency.

England: In 1946 the United Kingdom's rubber consumption was 126,000 tons. In 1947 they will consume 140,000 tons, and the objective for 1948 is 200,000 tons. The greatest consumers are the Dunlop group whose large factories have been expanded considerably. The new Speke plant, a converted aircraft factory, is a huge, well laid out unit. The equipment is all modern and this plant was expected to be operating at an annual capacity of nearly 25,000 tons by the end of 1947. Subsidiaries of U.S. and Continental companies, such as Goodyear, Firestone, Michelin and Pirelli, have large plants producing all types of rubber articles. Other U.S. firms have interest in leading British producers.

Advances in Rubber During 1947

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THE enactment of Public Law No. 24, early in 1947 by the Eightieth Congress, was an important step in the formation of a national policy on rubber. This legislation authorized the continuation of the wartime industry controls until March 1, 1948, so that permanent legislation could be prepared which would establish a long term policy on rubber as a national security measure *(1, 2)*. The establishment of a permanent synthetic rubber program has been encouraged by the rubber manufacturing industry *(3, 4, 189)*.

The consumption of natural and synthetic rubber continued at a high rate during 1947 and the prospects of the future indicate that this rate of consumption may be continued *(5, 6, 7, 185, 186)*. Free commercial trading was resumed in natural rubber and increased quantities have been available. In many products the use of natural rubber is unrestricted and some natural rubber may be used in the manufacture of all types of finished products.

Rubber Production

The development of a new chemical industry, capable of producing synthetic rubber at a rate of 1,000,000 long tons per year, has been described in a review of the governmental activities in the production of synthetic rubber *(184)*.

Improved processes for the preparation of crude rubber have been developed which employ continuous coagulation of Hevea latex *(8)*. Research in the development of rubber bearing plants has been continued under government sponsorship *(9)*. A summary has been prepared which describes the properties of the various grades of plantation and wild rubbers *(41, 188)*.

A continuous process has been developed for the isolation of GR-M from latex *(10)*. GR-S polymers may be divided into seven different groups according to their composition and properties *(11)* and synthetic latices may be classed into four distinctly different types *(12)*.

Research and Development

The vulcanization of rubber with sulfur has been reviewed from a theoretical and practical point of view *(13)*. New studies have been made of the sulfur linkage in vulcanized rubber *(14, 194)* and the change in properties which rubber undergoes during cure *(15)*. Phenol formaldehyde derivatives have been evaluated as vulcanizing agents for rubber *(16)*. Vulcanization by the Peachey process, involving alternate exposure of specimens to sulfur dioxide and hydrogen sulfide, resulted in good cures of compounds of all types of synthetic rubber with the exception of GR-M *(17)*. The chemical structure of certain organic accelerators was studied in the light of their effect upon rubber vulcanization *(18)*.

The oxidation of rubber has been investigated from a kinetic point of view *(19)*, and new data has been developed on the rate of the rubber-oxygen reaction *(20)*. The factors affecting the aging of vulcanized rubber have been reviewed and methods of preservation of rubber products developed *(180)*. Measurements of thermal decomposition of various rubber compositions in air show that exothermic decomposition takes place when compounds are heated rapidly to a temperature of 300°C. *(21)*. An evaluation of the effect of copper on the accelerated aging characteristics of neoprene has led to the development of methods of minimizing its effect *(22)*.

Further support has been given to the theory that the cracking of stretched rubber during outdoor exposure is due to atmospheric ozone *(23)*. Other factors affecting the oxidation of GR-S have also been evaluated *(24, 25, 26)*. Study of the structure of long chain polymers as revealed by X-rays has been continued by physicists *(195)*.

The electrical conductivity of natural rubber and GR-S compounds containing acetylene carbon blacks has been measured *(174)*. The dielectric properties of mixtures of polystyrene and polybutadiene, as well as other rubber compounds, have been studied *(175,176)*. The heat conductivity of various rubber compositions has been investigated over a wide temperature range *(43)*. Permeability of rubber-like materials to gases has been described in terms of the solubility and diffusion of the gas in rubber *(27, 28, 29)*.

Determinations of the swelling of natural and synthetic rubber compounds, when immersed in various organic liquids, has provided valuable comparative data *(30)*. The solubility of unvulcanized rubber in hydrocarbons is indicative of the effect of solvents on the vulcanized elastomer *(191)*. The effect of various types of carbon blacks upon the swelling properties of different synthetic rubbers has been the subject of several investigations *(31, 32, 33)*.

Synthetic rubbers have been tested for fabric to fabric adhesions *(183)*. A review of the factors influencing the strength of a rubber-brass bond presented evidence that the bond was a physical one rather than a chemical one *(34)*. Improved methods of bonding rubber to metal have been developed *(192, 193)*.

The rubber reclaiming industry has continued its efforts to improve the properties of reclaimed rubber. Experiments have resulted in the development of a method for estimating the quantity of GR-S in rubber reclaim *(35)*. Studies of the chemical reactions which take place during the reclaiming of rubber have continued *(36, 179)*. New chemicals for the reclaiming of rubber have been developed *(37)*. A comprehensive treatise has been prepared covering the history of reclaimed rubber, methods for its manufacture, its properties and uses *(38)*.

Note: This report was presented at the meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers, held in Atlantic City, N. J., on December 4, 1947.

The activities of the National Bureau of Standards in evaluating and testing rubber-like materials have been reviewed. A bibliography lists all the publications by this Bureau on the subject of rubber *(40)*. Methods for the evaluation of small quantities of synthetic polymers have aided the research in the improvement of synthetic rubber *(42)*.

The stability of polychloroprene dispersions and neoprene latices at low temperatures and in the presence of acidic materials has been the subject of considerable research *(44-47)*. Polymers of the GR-S type which have low water absorption properties have been developed for use in wire and cable insulation *(48, 49)*.

The importance of fatty acids and their soaps in the manufacture of synthetic rubber has been described *(50)*, and data has been published on the action of hydroquinone as an inhibitor of polymerization *(51)*. New mercaptans have been evaluated as modifiers for GR-S *(181)*.

Methods have been developed for concentrating GR-S latex *(52, 177)*. GR-S polymers have been fractionated and the physical properties of the various fractions determined *(53)*. The properties of substituted GR-S polymers have also been determined and compared with those of standard compounds *(54, 55)*.

The use of fluorocarbons as dispensing media has made possible the emulsion polymerization of isobutylene *(56)*. Additional information has been made available about the properties of Lactoprene, a polymer of ethyl acrylate and chloroethyl vinyl ether, and processes for its manufacture on a semi-commercial scale have been developed *(57, 58)*.

Developments in Rubber

The properties of rubber which are of special interest to engineers include the design factors of elastic materials which are applied to isolate, transmit or support various loads or forces and the factors involved in the use of rubber in tension *(59, 60, 61)*. The use of rubber parts in springs for commercial vehicles has increased *(62-67)*.

Reports have been published on the performance of neoprene in experimental tires *(69)* and on the use of all synthetic rubbers in tires and tubes *(68)*. The use of butyl inner tubes is claimed to result in increased tire life *(70)*. The use of synthetic rubber in tires was furthered by an investigation of the frictional properties of tread compounds on ice *(71)*.

Tires containing wire cord reinforcement have been produced on a commercial scale and have proved advantageous in off-the-road service *(72)*. Experimental tires have been built using glass cord fabric as the reinforcement *(73)*.

Heating and drying applications represent successful practical uses for electrically conducting rubber compositions *(74-77)*.

The factors which influence the backrinding of molded rubber products have been investigated and suggestions made for minimizing its occurrence *(78)*. Injection molding procedures have been developed for the production of large parts *(79)*, and an improved method has been devised for molding rubber printing plates *(80)*. An investigation has been made of the frictional properties of oil seal materials *(101)*.

Advances in latex technology have resulted in the development of a wide variety of new applications such as binders and impregnants for fibrous materials, rubber linings and coatings in which synthetic rubber latex compositions have been used *(82-84)*. The use of rubber linings and coatings for the protection of metal equipment has expanded *(81, 85-89)*.

Improvements in the properties of high temperature resistant synthetic compositions has widened their use *(90-96)*. Interest has been renewed in the use of rubber compositions as joint fillers for concrete pavement *(97-99)*. A method has been developed for the precision machining of rubber parts by freezing them *(100)*.

Testing Improvements

A great deal of information has been published during the year about methods of test. Improved methods have been described for the chemical analysis of synthetic rubber *(102)*, the determination of the rubber hydrocarbon *(103)* and the copper content of crude rubber *(104)*.

Procedures for testing rubber in government laboratories have been approved and standardized *(105, 187)*. Greater accuracy has been attained in the stress-strain testing of rubber compounds *(110)*. Statistical analyses of the results of laboratory tests on rubber have thrown new light on the reproducibility of various tests *(106-109)*. A correlation has been determined between the tensile strength and the brittle point of vulcanized polymers *(111)*.

An investigation of the effects which buffing of a tensile specimen had upon the test results led to the development of a new buffing machine *(112)*. Better equipment for the stress-strain testing of rubber has been developed *(113)*. The effect of the rubber surface on hardness measurements made by a ball indentation method has been reported *(114)*.

A simple cold test for vulcanized polymers measures primary creep at successively lower temperatures by means of a durometer or other hardness tester *(115)*. A new laboratory tester for measuring stiffness at low temperatures measures the angle of twist produced in a sample by a constant torsional force applied at various temperatures *(141)*. Another method evaluates flexibility at low temperature by stress-strain measurements *(142)*.

The abrasion resistance of rubber has been studied from the point of view of correlation of laboratory measurements with service wear. A survey of a number of tests showed that fair correlation was obtained between laboratory abrasion tests and tire tread performance *(116)*. Extraction of abrasion test samples gave better correlation between laboratory tests and service performance *(117)*. New equipment for abrasion testing has been developed *(118)*. Factors influencing results of tests for abrasion resistance have been discussed *(119)*.

A study has been made of methods proposed for measuring tear resistance *(120)* and procedures for improving the precision of tests for tear resistance developed *(121, 122)*.

Testing of rubber for cut growth was reviewed *(123)*. A new method has been devised for measuring the heat embrittlement of natural and synthetic rubber compounds *(124)*. A critical review and discussion of the present knowledge of hysteresis and methods for its measurement in rubber was presented *(125)*, and other studies of the dynamic properties of rubber described the measurement of vibration fatigue *(126)* and the effect of temperature on resilience and elastic losses *(127-129)*.

Improved methods have been developed for evaluating the surface cracking characteristics of rubber compositions when exposed to light *(130, 131)*.

Comparisons of the effects of accelerated aging of GR-S and rubber in an oven and oxygen bomb paid

particular attention to the effect which temperature and oxygen concentration had upon physical properties *(132, 133)*.

A method of measuring the resistivity of conductive rubber gives results that may be used as an indication of the relative value of compounds in actual service *(134)*.

A method of measurement of the adhesion of unvulcanized rubber to metal was obtained by observing the angle at which a metal ball rolls off a rubber surface when it is tilted *(135)*. The velocity and attenuation of sound in rubber strips were measured by the standing wave method *(136)*.

Determination of the rate of breakdown of rubber and GR-S can be made with a Brabender Plastograph *(137)*. A Mooney Plastometer can be used to determine the scorch characteristics of rubber stocks and the rate at which vulcanization proceeds beyond this point *(138)*.

Standard tests have been developed to evaluate the processability of rubber compounds *(139)*. Measurements of creep were used as a means of determining the behavior of antioxidants and accelerators in natural rubber and GR-S *(143)*. Laboratory methods have been developed for the evaluation of rubber torsion springs *(144, 145)*.

Compounding Ingredients

The effectiveness of softeners and plasticizers in GR-S continued to occupy the attention of a number of investigators. One study of the effect of plasticization on the properties of synthetic rubber divided softeners into solvent and non-solvent types *(146)*. A comparison of tire performance with the results of laboratory tests indicated that the latter are useful for selecting softeners for tire compounds but cannot be used for the precise prediction of their road performance *(147)*.

Silicone oils, although incompatible with rubber, are said to increase the resistance to abrasion of vulcanized compounds *(148)*. The cloud points of various coumarone-indene resins have been correlated with their effectiveness as softeners for rubber *(149)*. Low molecular weight polyisobutylenes are reported to plasticize natural rubber and GR-S and to shorten the milling time required for the incorporation of fillers and other ingredients *(166)*.

A variety of materials have been evaluated as plasticizers for nitrile type synthetic rubbers and blends of them with vinyl resins *(150-152)*. A graphical method has been suggested for presenting data on the performance of plasticizers in synthetic rubber *(153)*.

Research on carbon blacks and their effect upon the properties of rubber compositions has continued to be important. Several investigations have compared the performance of furnace type carbon blacks with that of the channel type blacks *(154-158)*. The effect of channel carbon blacks on the processing characteristics of synthetic rubber has been evaluated *(159)*. Further studies have been made of the structure of the carbon black particle, its oxygen content and oxidation characteristics *(160, 161)*.

Copolymer resins containing high proportions of styrene are valuable as reinforcing agents for non-black rubber compositions *(162, 163)* and water dispersions of these resins may be used in compounding latex *(164)*.

Organic fungicides have little effect upon the properties of natural or synthetic rubber but organic copper compounds do affect their aging characteristics *(39)*.

Wood cellulose and lignin have been investigated as compounding ingredients for rubber *(165, 183)* and phenolic resins are reported to improve the oil and heat resistance of synthetic rubber compositions and to increase their tensile strength and hardness *(167)*.

Nitrile type synthetic rubbers are reported to be effective plasticizers for vinyl resins *(168-172)* and several mixtures of these materials are being produced commercially.

Summary

A resume of the advances made in rubber technology during the year shows that, even with the increased consumption of natural rubber, a considerable proportion of the research and development effort of the rubber industry has been directed toward improving the properties of synthetic rubber products.

There has been an increased interest in the testing of rubber products and a noticeable trend toward the experimental evaluation of finished products under simulated service conditions *(178)*.

Thorough determinations of the properties of new polymers and compounds have revealed characteristics in synthetic rubber compositions which make them better suited to certain applications than products made from natural rubber *(190)*.

These developments have gone a long way toward overcoming the original prejudice against synthetic rubber products as temporary substitutes and have resulted in their acceptance by users on the basis of their merits.

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Nylon Cord Used in Goodrich Cord Conveyor Belts

NYLON is now being used in the manufacture of its patented transverse cord breaker, one of the most important features in its well-known Cord conveyor belt, according to a recent announcement by the B. F. Goodrich Co., Akron, Ohio.

The transverse cord breaker is one of the most vital factors in the ability of the Cord conveyor belt to withstand excessive gouging, heavy loading and extremely severe service. Consisting of a layer of parallel cords, embedded in rubber laid transversely on the belt and acting as a shock absorber, it retards gouging or cutting because of its lengthwise stretch, and keeps the rubber in the cover and carcass from being distorted beyond its elastic limits, thus greatly increasing belt life.

The transverse breaker also increases the adhesion of the rubber carcass of the belt to the cover, and tests show that the nylon cord now being used has as good or better adhesion qualities than the cotton cord formerly employed, besides many other advantages.

Among principal advantages of the use of nylon in this service, the company says, is the higher tensile strength of the cord compared to cotton, tests showing that it is a least 55 per cent stronger. This increase is gained despite the fact that the nylon cord is less than half as thick as the cotton, and this in turn permits a great increase in the thickness of the shock absorbing rubber cushion on both the top and bottom of the transverse breaker.

The nylon cord also has more than twice the stretch and recovery of cotton before the breaking point. This gives the new breaker and the belt itself greater resistance to severe impact at the conveyor loading points, and consequently protects the belt carcass from shock for a longer period.

Cover wear of the belt with the new nylon transverse breaker is reduced because of the improved cushioning provided by the greater thickness of rubber on top of the nylon cord breaker.

Editorials . . . . . .

Consumption in 1948

AS POINTED OUT in the year-end statements of several leading rubber executives, the rubber industry in 1947 for the second consecutive year contributed heavily to the nation's postwar recovery. Production of passenger tires, for example, reached some 78,000,000 units, as compared with 66,466,314 units in 1946, while the production of truck and bus tires exceeded 17,000,000 units, as against 15,831,862 in the previous year. Although final figures are not yet available, the consumption of rubber for 1947 is believed to have slightly exceeded 1,100,000 long tons, a new all-time high, which compares with the previous record of 1,039,296 long tons consumed in 1946. The average consumption of rubber during the 10-year period from 1932 to 1942 was 529,100 long tons annually.

The record consumption of rubber in the past year is of course attributable to the tire production rate. Despite every prediction to the contrary, this rate was maintained throughout the year with only minor peaks and valleys. The replacement demand accumulated during the war was expected to have been placated by last August, but the demand continued throughout the summer and the entire fall season. It has not yet shown definite signs of falling off sharply but has begun to taper off slowly in various localities.

Consumption of rubber in 1948 is closely allied to tire production. According to the best estimates available, such production should reach between 83,000,000 and 85,000,000 units, consisting of between 65,000,000 to 68,00,000 passenger tires, 12,000,000 to 13,000,000 truck and bus tires, and some 5,000,000 agricultural tires. If these predictions are accurate, the consumption of approximately 900,000 long tons of rubber is assured during the coming year.

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Technology Conference

IT IS gratifying to learn, as reported elsewhere in this issue, that the Institution of the Rubber Industry will sponsor a second International Rubber Technology Conference. It will be held in London from June 23rd to 25th, and should draw an attendance of over 1,000. The first Conference, held in London in May, 1938, attracted 553 delegates, of whom 198, or approximately 40%, were from overseas, representing 24 different countries. That Conference lasted three days, with over 100 papers presented. The papers, and subsequent discussion, were later published in the "Proceedings of the Rubber Technology Conference, 1938," a book which has since become a valuable part of the rubber literature.

Much water has passed under the bridge since the last Conference was held, and tremendous strides have been taken in rubber technology in the interim period. Whereas only one session was devoted to "Synthetic Rubber-Like Materials," with only five papers presented on the subject, it is safe to predict that double or triple that number will be presented at the 1948 sessions. The Conference Committee has already indicated that separate sessions will be held on "Natural and Synthetic Rubber Latices" and "Synthetic Rubber."

The success of the Conference is dependent upon presentation of papers of high standard and, accordingly, the committee in charge has issued invitations to numerous well-known technologists all over the world. However, this is not a closed conference, and any person may submit a paper on his own initiative if he so wishes. The committee merely stresses the point that only papers of a high standing and dealing with original work will be accepted for presentation. This represents a challenge to all technologists, and should result in numerous papers which will prove of inestimable value to the rubber manufacturing industry at large.

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National Defense

WITHIN the next several weeks the House Armed Services subcommittee headed by Paul Shafer (Rep., Mich.) will offer a bill on rubber legislation to the new Congress. The activities of this subcommittee in gathering testimony from both government and industry have been reported in this journal, and some of the proposals the bill will contain have also been published. It should be evident by this time that the over-all situation is still cloudy and it would be impossible to pass legislation pleasing to all segments of the industry. One thing is most clear, namely, that the Shafer subcommittee regards the problem primarily as one of national defense and will make its proposals on that basis. All else is speculation.

CURRENT NEWS OF THE MONTH

RUBBER INDUSTRY SHATTERS 1947 PRODUCTION ESTIMATES

The nation's rubber manufacturing industry shattered all production estimates in 1947 when its mills consumed a record 1,110,000 long tons of new rubber and manufactured three billion dollars worth of finished products, according to the Rubber Manufacturers Association.

This was the record as measured against the previous peak year of 1946: 77,000,000 passenger car tires were produced in 1947 against 66,466,000 in 1946; 17,500,000 truck and bus tires produced in 1947, compared with 15,832,000 produced in 1946; 80,000,000 truck, bus and passenger tubes were produced in 1947, while 77,251,000 were produced in 1946.

Natural rubber consumed in 1947 totaled 556,000 long tons, compared with 277,597 consumed in 1946; 554,000 long tons of synthetic rubber were consumed in 1947, while in 1946, 761,699 long tons were consumed; total new rubber consumed in 1947 amounted to 1,110,000 long tons, 1,039,296 in 1946. Reclaimed rubber consumed came to 285,000 long tons in 1947, 275,410 long tons in 1946.

Cite Voluntary Consumption

The Association singled out as one of the most significant developments of the year the fact that voluntary consumption of synthetic rubber had exceeded by a considerable margin the expectations of both government and industry officials. As of today, the industry is required to use synthetic rubber to meet about one-third of its total requirements for new rubber. This is a national security stipulation laid down by the government last March 31 as insurance against repetition of the near disaster of 1942 which saw the U. S. cut off from virtually all sources of natural rubber.

On a one-third, two-thirds basis, the industry would have consumed roughly 370,000 tons of synthetic rubber had it conformed only to the now existing minimum requirements. Actually, synthetic rubber consumption amounted to 50% of our total requirements, it was pointed out. While it is true that minimum requirements did not drop to the 33⅓% level until September, voluntary use has continued substantially in excess of the minimum through the past four months.

With respect to both consumption and production, the industry's 1947 performance transcends the best forward estimates developed by both trade and government economists a year ago. It had been predicted, generally, that passenger tire production might decline to about 60,000,000 units and that consumption of new rubber might aggregate between 900,000 and 950,000 tons.

Truman Opposes Sale

President Truman is firmly opposed to the sale of the government-owned synthetic rubber plants to the big rubber companies, according to a statement issued by Senator Kilgore (Dem., West Va.) on December 23 following a visit to the White House. Senator Kilgore said that if the plants are sold and later scrapped there would be "inflation in rubber prices" and added that the President heartily agreed with this position.

Major incalculable of a year ago appears to have been the fact that there was no way of computing 1947's staggering increase in driving. By every index—gasoline consumption, vehicle mileage and others—truck, bus and passenger car mileage has increased sharply since 1940. As a consequence, passenger car tire production exceeded the best estimate of a year ago by roughly 25%.

With natural rubber supply still far below normal, only the availability of synthetic rubber made it possible for the industry to achieve its production ticket on tires, tubes, hose and mechanical goods, hard rubber, footwear and thousands of other rubber products.

Demand continues extremely high for all types of rubber products. Chief among items in which demand exceeds supply is conveyor belting, under heavy priority pressure both in the domestic picture and in Europe where it is urgently sought for rehabilitation of mines and other war-damaged industries.

Neither the government nor the industry had sighted at the year's end a final solution to the national security aspects of the rubber problem. The industry enters 1948 still bound by the security restrictions written for the short term last March in Public Law 24. By provision of regulations issued under this law, the tire and tube manufacturers and some users of latex for foam products are required to use one-third of the industry's total new rubber requirements in synthetic rubber.

Another law also provides for security stockpiling of natural rubber and RFC continues its wartime agreement on cross-licensing and patent pooling.

Hewitt Forms Contract Division

Hewitt-Robins, Inc., Buffalo, N. Y., has set up a new division, Robins Engineers, to handle the contracting phases in the design, engineering and installation of complete material-handling and processing plants. The announcement was made by Thomas Robins, Jr., president.

LITCHFIELD CITES ROLE OF INDUSTRY IN RECOVERY PROGRAM

According to the year-end statement of P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., the rubber industry in 1947, for the second consecutive year, contributed record-breaking production to the nation's post-war recovery. Manufacture of passenger car, truck, and bus tires not only reached all-time highs during the past twelve months, but the industry also consumed a record number of tons of rubber in turning out an over-all increase in manufactured rubber products.

Production of automobile passenger tires will approximate 78,000,000 units for 1947, compared with 66,466,314 last year, said Mr. Litchfield. Truck and bus tires will exceed 17,000,000 units, compared with 15,831,862 units a year ago. The total amount of rubber now consumed will approach 1,100,000 long tons against that of 1,039,296 tons in 1946. These figures are more impressive when compared with prewar production of 50,391,000 passenger and 11,148,000 truck and bus tires in 1941 and 50,965,000 passenger and 8,221,000 bus tires in 1940.

Tire Record Set

The average consumption of new rubber by the industry during the 10-year period from 1932 to 1942 was 529,100 tons annually, just about half of what has been used during each of the past two years. During the first 10 months of last year, Goodyear plants produced 25,000,000 pneumatic tires for motor vehicles, another record for 1947. The final figure of more than 27,000,000 pneumatic tires manufactured in a single year by Goodyear will be still another record.

Not only was tire production up at Goodyear, said Mr. Litchfield, but the increased amount of raw materials consumed was reflected in growing mechanical goods capacity and expanded production in soles and heels, flooring and other rubber products, including Pliofilm and Airfoam. Goodyear also introduced the postwar automobile tire, the Super Cushion, which has been hailed as the outstanding tire development since 1923, he said. This tire was engineered on new principles to improve the riding and driving qualities of the automobile through its larger sectional width and reduced air pressure, according to Mr. Litchfield.

Industrywise, the rubber manufacturers have done a marvelous reconversion and postwar production job in the past few years. And with wages up, and materials and transportation costs rising, the industry has turned in a good performance in holding down the prices of its products, concluded Mr. Litchfield.

SPECIAL RUBBER SECTION SUSPENDED BY AGREEMENT

The State Department announced on December 19 that at the request of the United Kingdom the section dealing with rubber in the general agreement on trade and tariffs that was recently negotiated at Geneva has been suspended pending renegotiation. Although the new tariff agreement went into effect on January 1, renegotiation of the rubber section will not take place until after March 31 of this year.

According to officials of the United Kingdom, the rubber section as now written was due to a "misunderstanding." Washington officials stated that it was not yet completely clear as to what the misunderstanding actually consisted of, other than that it concerns the definition of what constitutes total rubber consumption in the United States in any one year.

Section C of Schedule XIX of the agreement makes provision for reductions in margins of preference on more than 800 items in British colonial areas and provides further that this concession may be made inoperative in the event that United States regulations require the consumption of more than 25 per cent of general purpose synthetic rubber out of the total consumption in this country of natural, reclaimed and synthetic rubber.

"The provisions of the undertaking," the State Department said, "did not become clear until after the close of the Geneva conference. In view of the fact that there was not full accord on this undertaking the United States has agreed to its suspension, with the understanding that this arrangement does not involve relinquishing this concession on either side but leaves the United States and the United Kingdom free to agree upon mutually satisfactory terms at a later date."

England Admits Blunder

In England, a Conservative member told the House of Commons on December 19 that Britain had made a "considerable blunder" at the Geneva trade negotiations by agreeing to reduce imperial preference tariffs in the Colonies in return for a proposed limitation on the use of synthetic rubber in the United States.

Harold Wilson, president of the Board of Trade, said that there had been a misunderstanding on the use of reclaimed rubber and that Britain and the United States were renegotiating the agreement. He promised that Britain would be "extremely careful to see that all technical points are fully covered."

Mr. Wilson said Britain had agreed to cut imperial preference tariffs on imports of United States goods to the Colonies in return for a concession by the United States to import more crude rubber from Malaya. The United States agreed to cut the use of general purpose synthetic rubber to 25 per cent of total consumption, including natural, synthetic and reclaimed rubber. The present use of synthetic rubber is about 33 per cent of annual consumption.

Walter Fletcher, Conservative, repeating widespread criticism, said that by computing the use of reclaimed rubber there would be little increase in the United States raw rubber imports. Mr. Wilson acknowledged that reclaimed rubber should not have been included in the agreement.

Coming Events

Feb. 6. Akron Rubber Group, Hotel Mayflower, Akron.

Feb. 6. Chicago Rubber Group.

Feb. 12. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

Feb. 13. Connecticut Rubber Group.

Feb. 20. Detroit Rubber & Plastics Group.

Mar. 8-20. American Toy Fair, Hotel McAlpin, New York.

Mar. 11. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

Mar. 19. Boston Rubber Group, Hotel Somerset, Boston.

Mar. 26. Chicago Rubber Group.

Apr. 8. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

Apr. 16. Akron Rubber Group.

Apr. 21-23. Rubber Division, A.C.S., Spring Meeting, Hotel Sherman, Chicago.

May 7. Chicago Rubber Group.

May 13. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.

May 14. Connecticut Rubber Group.

May 21. Detroit Rubber & Plastics Group.

June 7-10. Chemical Institute of Canada, Annual Conference, Montreal, Canada.

June 18. Akron Rubber Group, Outing.

June 21-25. A.S.T.M., Annual Meeting, Book-Cadillac Hotel, Detroit.

Sept. 24. Boston Rubber Group, Somerset Hotel, Boston.

Nov. 8-10. Rubber Division, A.C.S., Fall Meeting, Book-Cadillac Hotel, Detroit, Mich.

Dec. 17. Boston Rubber Group, Somerset Hotel, Boston.

Maprofix Neu Powder

Maprofix Neu Powder, an anionic surface-active material with unusual detergent properties, is reported to be finding application as a dispersing agent in rubber and pigment compounds. A product of the Onyx Oil & Chemical Co., Jersey City 2, N. J., it is also said to have a highly effective wetting action over practically the entire pH scale. In addition to its wetting action, it also displays penetrating and dispersing action, and is especially notable for the volume and persistence of its foam. According to the manufacturers, Maprofix Neu Powder is stable to oxidation and atmospheric conditions, and is compatible with acids up to a strength of 2% and with alkalies up to 5% caustic soda.

NEW TECHNOLOGY CONFERENCE SCHEDULED FOR JUNE IN LONDON

The Institution of the Rubber Industry, London, England, has announced that arrangements have been completed for the Second Rubber Technology Conference to be held at the Central Hall, Westminster, London on June 23, 24 and 25. The first conference held in 1938 was attended by 533 delegates, of whom 198 were from overseas representing 24 countries.

The 1948 conference will cover the following subjects: Natural and Synthetic Rubber Latices; Chemistry of Rubber; Physics of Rubber; Testing and Analysis; Synthetic Rubbers; Compounding Ingredients; Fibres and Textiles; and Developments in Factory Processes and Products Since 1938.

The Conference Committee is now issuing invitations to eminent men all over the world to submit papers for the conference, and it is intended that all subject matter submitted to the conference be original in character. Although papers will in general be given by invitation, the Conference Committee will, nevertheless, consider papers on new or original work from individuals who believe that they have information of unusual interest or value to impart. Persons so interested should write to the Conference Secretary, John T. Coleman, at 12, Whitehall, London, S. W. 1, England.

It is intended to run the sessions consecutively, and not in two series running simultaneously as before, so as to allow participants to attend every paper if they wish. Copies of the papers will be circulated as long in advance as possible, thus covering the major portion of Conference time for profitable discussion.

After the conference all papers, together with discussions thereon, will be published by the Institution, as was done after the first conference, in a bound volume. The fee for the conference is approximately $10.00, and this includes a copy of the "Proceedings" above mentioned, and the preprints.

Form Malayan Latex Company

Further evidence of steps being taken in the Far East to meet the demand for latex was recently provided in London by the announcement by Boustead and Co., East India merchants, that a new company has been formed in Malaya to concentrate latex. Registered under the name of Boustex, the new company is to purchase latex from rubber estates and will concentrate it by a creaming process. The plant being erected at Kajang is scheduled to start early production and storage tanks are being installed at Port Swettenham to handle bulk shipments. The resultant mixture from the process will be a desludged cream concentrate. Close controls are to be instituted to guarantee a uniform and high quality product. Sales on the London market are to be handled by Boustead and Co., and in New York through H. A. Astlett and Co. A bulking and storage installation is being erected at Baltimore, Md., and arrangements have been made with the Astlett Latex Corp. to receive and handle shipments.

REPORT ON RUBBER POLICY ISSUED BY MALAYAN AGENCY

Far reaching recommendations for increasing the efficiency of the rubber industry in Malaya, as well as comments on the over-all rubber field, including the status of synthetic rubber, are contained in the first report of the Malayan Rubber Advisory Committee. The committee was established in July, 1947, and under the chairmanship of the Economic Advisor to the Governor-General submitted its first report last October.

The report reviews the world rubber consumption and production statistics. It states that the high level of consumption in 1947 and to some extent for 1948 is mainly a result of the pent-up demand for replacements due to the restrictions of the war years and it was to be expected that some fall would take place in the subsequent period when this demand was satisfied.

Apart from further political upheavals there is, however, no reason to anticipate that the long run upward trend of the interwar period will not be resumed once the transitional phase is over. Any advance in the standard of living, especially in heavily populated areas such as India and China, is bound to have immediate effects on the demand for transport and therefore for rubber.

From 1930 to 1939 world consumption increased from 711,000 long tons to 1,108,000 long tons. A potential production of 1.6 million to 1.8 million tons of natural rubber annually is indicated by the acreage statistics, if the Netherlands Indies again attain full production.

In its discussion of policy, the report mentions "the policy of the United States to create a market for synthetic by continuing end-use control" as "a policy of creating an artificial market for synthetic rubber and thereby forcing down the standard of living of the natural rubber producers."

Regarding the 250,000 tons annual synthetic consumption proposed by the Interagency Policy Committee on Rubber, the report states that "it is certain that the forcing of a market for anything like these levels of synthetic production, irrespective of the quantity of natural rubber coming forward, has exerted and must continue to exert a downward effect on prices with adverse repercussions on the territories of South East Asia." It urges that the United States rely on stand-by synthetic plant facilities and a stockpile of natural rubber.

"The rubber producing areas of South East Asia can only view with concern the manner in which the U. S. A. is interpreting its strategic requirements of rubber." It is argued that both styrene and butadiene facilities can be used in the production of commodities other than rubber; this is not yet clear so far as butadiene is concerned.

Malayan estate modernization through a gradual process of replanting and new planting is recognized as a desirable long term policy, contingent upon financial considerations, availability of labor and planting material, and probably future consumption of rubber. The report advocates Malayan Government assistance to such a renovation program, concentrating such assistance "as far as possible in the section of the industry which, by reason of its conservative dividends policy and new and replanting programs, has proved to be the most efficient."

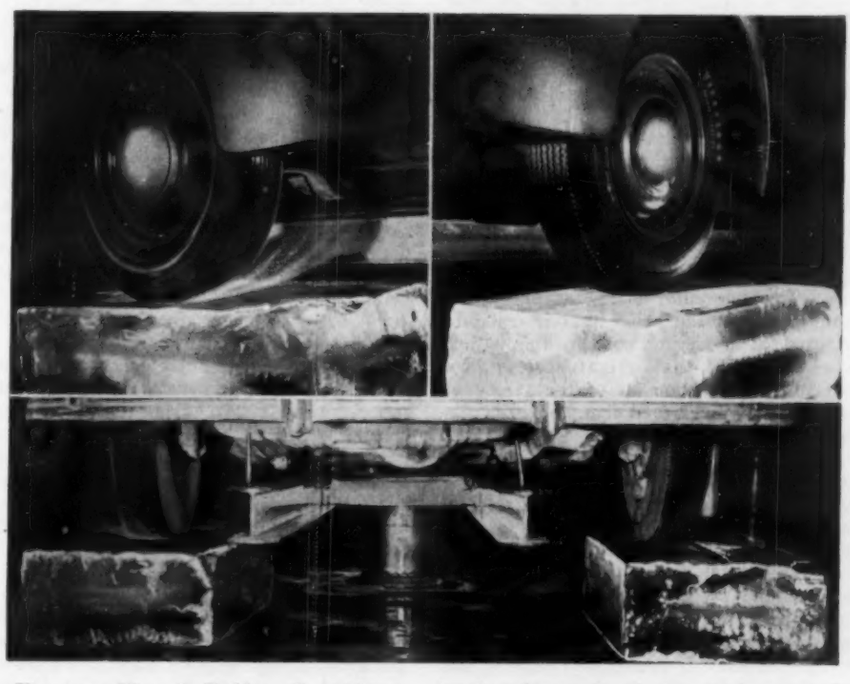
The report also advocates the "maximum possible concentration of the improved material," as a fully modernized estate would have greater competitive strength than several partly modernized estates. It is recommended that quitrents on replanted areas be reduced during the period of immaturity to the same rate as for newly planted areas. The impracticability of replanting by smallholders, except possibly through cooperative societies, is discussed.

The report also urges the establishment of a research policy consistent with the needs and importance of the British natural rubber industry, recommending that as a matter of urgency a scheme of research be drawn up, showing the necessary division between the United Kingdom and Malaya, and estimating staff requirements, salaries, and terms of service necessary to attract the proper personnel, so that consideration can be given to this problem.

The report closes with a statement of the costs of production on 50 Malayan estates, comprising 105,536 acres (approximately a 5 percent sample), during the first half of 1947. The weighted average f.o.b. cost is given at 28.19 Straits cents (a Straits dollar is equivalent to approximately $0.47 U. S. currency), and additional capital and rehabilitation expenditure (for estates with such expenses) raised total average expense to 35 Straits cents per pound of rubber. The average f.o.b. Singapore price for R.S.S. No. 1 for the period was 40.22 Straits cents.

The range of costs was wide, the lowest individual f.o.b. cost being 17.21 cents and the highest 45.67 cents. The range of collection costs was 5.23 cents to 19.69 cents per pound. "Wages for tappers on the 50 estates vary from $2.90 (Straits) a day in one area, where both labor and rice are relatively scarce, to 90 cents a day in a rice-producing district. Similarly, where tapping is done on a contract basis rates per pound vary from as high as 18 cents to as low as 9 cents. These differences will of course tend to disappear when the pressure on the labor market is eased and supplies of rice are increased."

NEWLY-DEVELOPED FIRESTONE TIRE TREAD PERMITS SAFER DRIVING



Firestone Tire & Rubber Co., Akron, has introduced a tire featuring a newly-developed tread with thousands of tiny suction cups which are said to grip ice and wet pavements with amazing effectiveness. The tire is said to represent the greatest contribution to safe driving this winter.

Appropriately named the "Polar Grip," the tread of the new tire is molded by what Firestone calls "Icocel" construction. Thousands of small "Icocel" particles are molded into the rubber and as the particles are exposed by tire wear they fall out, leaving thousands of tiny suction cups in the tread. The Polar Grip Tread can be applied to any worn passenger car tire.

The photograph reproduced above is that of the dramatic demonstration used by Firestone to prove the non-skid characteristics of the Polar Grip Tread. In the demonstration, the wheels of an automobile are set on ice. A tire with conventional tread (left) spins on a 300-pound cake of ice while the tire with the Polar Grip Tread (right) firmly grips the ice, indicating the non-skid protection afforded by the tread.

SYMPOSIUM ON NATIONAL RUBBER SITUATION IS HELD IN WASHINGTON

A timely Symposium on the National Rubber Situation, which attracted an audience of well over 200, was held in the Chamber of Commerce Building at Washington, D. C., on January 13, under the auspices of the Chemical Engineer's Club of Washington. The Symposium was preceded by a dinner at the Hotel Lafayette in honor of the panel speakers.

Participating in the Symposium, which was followed by a stimulating question-and-answer session, were the following: Admiral C. E. Braine, Chairman, Army-Navy Munitions Board Rubber Committee, who also acted as moderator; G. P. Hadlock, Executive Director, Office of Rubber Reserve; William G. Phillips, Department of State; J. P. Coe, Vice-President, U. S. Rubber Co.; R. P. Dinsmore, Vice-President, Goodyear Tire & Rubber Co.; and Representative Fred Crawford (Rep., Mich.).

John Livingstone, at one time a vice-president of the Rubber Reserve Co., who was in charge of construction details on the synthetic rubber plants, was introduced during the dinner hour and made a brief address. He said that the creation of the American synthetic rubber industry in so short a time was the greatest program ever carried out in this or any other country. Crediting the growth of the industry to excellent all-around teamwork, he stated that on a trip to Germany after the war the leading German technologists were completely amazed at the tonnage accomplished in the United States in so short a period of time.

Viewpoint of National Defense

Admiral Braine, the first speaker at the Symposium, discussed the rubber problem from the viewpoint of national defense. Listing rubber as one of the major materials in any industrial mobilization program, he said there was a direct security need for minimum synthetic production and expressed the belief that it could be secured at moderate cost to the nation. He also stated that a reasonable rubber stockpile was important to the safety of the country, and urged that domestic rubber-growing activities be encouraged.

Admiral Braine expressed gratification over the fact that the rubber manufacturing industry is in complete agreement on the necessity of maintaining a synthetic rubber industry as a national defense measure, despite the fact that the size of the industry was in dispute. He cited some of the recommendations for national rubber legislation recently made by the Munitions Board to Congress and concluded with the statement that from a military viewpoint the United States needs a synthetic rubber industry.

The relation of the synthetic rubber industry to the national economy was the subject of Mr. Hadlock, the second speaker. Rubber, he stated, like all other materials, follows the law of supply and demand, and restriction schemes which force prices up are unfair to the consumer. The United States, he added, should never again be completely dependent for its rubber supply on sources thousands of miles away.

Referring to the $760,000,000 investment made by this country in synthetic rubber, Mr. Hadlock revealed that during 1947 some 12,000 people were employed in the production of approximately 400,000 tons of GR-S. This compares with employment of 22,000 at the peak of operations in 1945. The present GR-S shortage, he indicated, was due to "human error" on the part of both government and industry. In concluding his talk he predicted that eventually synthetic rubber will be known simply as "rubber."

Some International Problems

Mr. Phillips, the next speaker, discussed the international implications of the rubber problem, which are many and varied. He said that one of the functions of the State Department in these troubled times is to aid in the prevention of economic distress in any part of the world, and accordingly some balance must be found between natural and synthetic rubber. The natural rubber producing countries, he stated, understand and appreciate the necessity of maintaining a synthetic rubber industry in the United States, and they are concerned only with the size of that industry and its over-all effect on the price structure.

Mr. Phillips said that the importance of rubber to foreign countries can be realized from the fact that during 1947 British Malaya shipped approximately 550,000 tons to the United States, with a value of some $350,000,000. He pointed out that the expansion of rubber manufacturing facilities in foreign countries will represent a problem in American rubber goods exports as soon as the backlog of orders is diminished. He deplored the existence of special trade agreements between some foreign countries and the protection of domestic industries by high tariffs, and said that the State Department favors the maintenance of trade in Private hands.

Status and Future Outlook

The present technological status and future outlook for synthetic rubber was the subject of Mr. Coe, the following speaker. Describing synthetic rubber as "a man-made plastic material which must be stretchy," Mr. Coe briefly described some of the properties of neoprene, GR-S, butyl, and the nitrile rubbers. He said that synthetic rubber had proved itself as a new material to be used on its own merits, and these merits assured its continued use. He termed the question as to how good synthetic rubber tires are as an academic question, and suggested we leave it to the discretion of the tire engineers who throughout the years have continued to produce improved tires.

Mr. Coe referred to the fact that numerous varieties of GR-S are available, each engineered to do a special job, with some 50 of such varieties now in actual production. He also made mention of a new polymer which will shortly reach the production stage and which, according to preliminary data, will result in tire treads "substantially improved over anything achieved heretofore with natural rubber." The new polymer, he added, will be made at temperatures between 0 and 40° F., instead of at the customary 125° F. Units for the production of the polymer are being installed at the Borger plant, operated by U. S. Rubber, and the Baton Rouge plant, operated by the Copolymer Corp.

The next speaker was Dr. Dinsmore, whose topic was the stabilizing of the domestic rubber industry. Dr. Dinsmore disagreed with the theory that turning over the synthetic rubber plants at present to private interests would result in polymers which could compete with natural rubber either in cost or quality.

National security will require a stockpile of natural rubber which may be as much as 800,000 longs, plus a stockpile of synthetic rubber equivalent to three months' output of the idle portion of 600,000-ton capacity. To permit such stockpiling, Dr. Dinsmore said, 275,000 long tons minimum of GR-S must be produced annually until some time in 1949.

Pointing out that according to recent testimony GR-S can be produced for an out-of-pocket cost of about 14½c but that other necessary charges brought the cost up to or above the 18½c selling price, Dr. Dinsmore suggested that legislation be passed permitting Rubber Reserve to cut these additional charges to around 1c per pound, so that GR-S could be sold at 15½ to 16½c per pound, thus extending the period of time over which GR-S would be competitive. He predicted that within 18 months or so, when natural rubber becomes plentiful, it may sell for anywhere from 12c down per pound.

Proposed Rubber Legislation

Expressing the viewpoint of the Congress, Representative Crawford, the final speaker, stated that the synthetic rubber industry must be preserved on a basis that protects the American taxpayer and bondholder. Mr. Crawford, an advisor to the subcommittee of the House Armed Services Committee, which is drafting rubber legislation to be presented prior to March 31, discussed some of the proposals which will be contained in the proposed bill.

According to Mr. Crawford the bill will propose the maintenance of facilities, either actual or standby, for the production of 600,000 tons of GR-S and 75,000 tons of butyl rubber per year, with the specific actual annual tonnage to be set by the Congress. Provision will be made for the mandatory use of one-third of these amounts, or 200,000 tons of GR-S and 25,000 tons of butyl rubber per year.

Mr. Crawford also stated that the subcommittee may recommend that the President be given authority to determine whether imported rubber manufactures must match the domestic products insofar as synthetic content is concerned. On the other hand, it will be suggested that domestic rubber goods intended for export be freed of all restrictions.

The bill may also propose that the sale of synthetic rubber plants be dependent on Congressional approval in each case; that the President be allowed to specify which government agency shall handle the rubber program; that all rubber activities be consolidated into one single agency, and that at least one alcohol-butadiene unit be retained in the synthetic rubber program.

TRENDS ESTABLISHED IN 1947 REVIEWED BY GOODRICH HEAD

The American rubber industry during 1947, thanks to an outstanding record of sustained high production, all but erased entirely the large war-borne tire shortage, and in so doing set what probably will prove to be an all-time record in total rubber consumption, according to the year-end statement issued by John L. Collyer, president of the B. F. Goodrich Co. He estimated consumption for the year at 1,080,000 tons, as compared with the actual 1,039,000 tons consumed in 1946.

Because the industry drove ahead and maintained its high postwar production level, tire supply and demand had reached nearly normal balance before mid-year.

Tires were one of the very first of major articles to "come back" to anything like normality, and by the end of 1947 there were only a relatively few thin spots in inventories as reminders of the wartime drought.

In 1948, obviously, the work of cutting down the war-built backlog, in not only tires but in industrial products and sundries, will be progressively less of a factor in determining total demand, and in most articles the backlogs will have disappeared long before that year's end, said Mr. Collyer. Even so, the estimate for 1948 is that total consumption may reach 870,000 tons. This would still be considerably larger than any prewar year (33 per cent higher than 1940)—larger, in fact, than any years except 1946 and 1947.

The rubber industry was able to play an important role in 1947 in one of postwar America's most important battles, that for food production. Farm vehicle tire sales set a new all-time record, at more than $100,000,000, as American farmers continued to turn to the speed and economy of rubber-tired tractors and other implements in their intensified efforts to boost production to meet domestic and aid-to-Europe needs.

The year marked the start of official congressional action on deciding policy as to disposition of the plants and facilities created to produce American rubber as a war measure. Meanwhile, as physical need for this rubber declined with the increasing availability of crude rubber from the Far East, activity in those plants was steadily cut back until, at the year's end, roughly half the original designed capacity had been closed down.

About 350,000 tons of American rubber will probably be used in 1948, according to Mr. Collyer. This would be about 40 per cent of the anticipated total consumption of 870,000. In 1945, the partly wartime year, dependence upon American rubber reached a peak of 86.9 per cent of total use; for 1946 it was 73.3 per cent, and for 1947, approximately 50 per cent.

There seemed to be little disagreement as to the basic necessity of seeing to it that the nation's rubber insurance policy which these rubber-making facilities represent be kept in effect, as a vital national-security measure. It is only in the working out of "ways and means" of retaining this rubber insurance most effectively, from the standpoint of the nation's economy as well as defense that differences arise.

Synthetic Investment

The $750,000,000 that went into the building of synthetic rubber facilities in the United States was one of the best investments the country ever made, James J. Newman, vice-president of the B. F. Goodrich Co., recently told the Advertising Club of Los Angeles. If it were not for the war-created plants, he said, natural rubber would be selling for $1.00 a pound, and tire prices would be almost twice their present levels.

Mr. Collyer stated that Goodrich's position, consistent with that which it has held ever since the creation of the American rubber plants, is that (1) government participation in rubber making, as well as in allocating and other regulation, should be confined strictly to that area necessary to assure military security; (2) the facilities should be continually offered for sale or lease to industry, subject to conditions to be prescribed by the National Security Resources Board, and (3) wartime agreements for exchange of technical information pertaining to man-made rubber should be terminated, in the interest of stimulating renewed private research and development.

Significant developments during 1947 included a trend toward extra-low-pressure tires, mainly as original equipment on new model automobiles, and the introduction by Goodrich of a tubeless, self-puncture-sealing tire. This tire, representing the biggest single change in tire conception since the change from square-woven fabric to cords, is expected to be available for regular commercial sale in a few areas within the next two months.

In the field where rubber and the chemicals industry have growing mutual interests, 1947 saw considerable development and marketing of materials, called by Goodrich Chemical "polyblends," in which crude or American rubbers are blended with plastic materials to achieve end products having the better features of both rubber and plastics. Goodrich also introduced several new agricultural chemicals that are expected to contribute greatly to the war on insects, molds, and grasses and weeds.

Wins Public Relations Award

Paul Weeks Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., has been chosen to receive the 1947 Public Relations Award for the greatest contribution during the year, through public relations, to the national welfare. Formal presentation will be made on February 3, 1948, at the annual dinner of the National Association of Public Relations Council, Inc., at the Waldorf-Astoria Hotel, New York City. Mr. Litchfield was voted the award primarily because of the sponsorship by his company of the weekly broadcast, "The Greatest Story Ever Told," a dramatization of the Bible.

TRUCKERS OF FARM PRODUCE PAY LARGE SHARE OF TIRE TAX

The motoring public paid out $159,000,000 in excise taxes on new tires and tubes in 1946, and almost 14% of that amount was borne by the men who haul the nation's farm products, according to a study made by the Rubber Manufacturers Association. The tax bill for the haulers of farm products reached $22,044,000. This figure does not include additional tire and tube taxes paid by haulers of processed foods and processed dairy products.

The Association's study grew out of a plea to Congress by tire and tube manufacturers for downward revision of the excessively high wartime excise taxes still levied against these rubber products. Tax loads on different groups of tire users were estimated by the Association on the basis of the number of registered vehicles in each type of service.

For trucks and trailers engaged in the hauling of processed foods, the bill was $2,496,000; for those hauling dairy products, $1,164,000; for those hauling timber, $1,350,000; and for trucks in service in the packing industry, $474,000.

Present estimates indicate that the tire and tube tax for 1947 will almost reach the $170,000,000 mark as compared with the $159,000,000 in 1946. In 1940, before excise taxes were increased to their present levels, the nation's tax bill on tires and tubes totalled $45,091,092.

In its recent appeal to Congress, the tire and tube industry declared that the tax on casings—ranging from 7 to 14% of the sales price in various levels of sale—approaches levies made against luxury items. The industry argued that tires are not luxuries. They are tools of trade in a healthy national economy, essential in the transportation of millions of workers and in the production of most of the nations food, and hundreds of other products, industry spokesmen said.

Organize Moss-Mayfield, Inc.

Amos D. Moss, former director of purchases for the B. F. Goodrich Co., who retired last June after 48 years with that company, and Fred A. Mayfield, until recently technical adviser to President William O'Neil of the General Tire & Rubber Co., have organized Moss-Mayfield, Inc., with headquarters in the Second National Building in Akron, Ohio. The new concern will function as a sales agency for manufacturers of rubber chemicals and compounding ingredients, as well as other materials, used in the rubber manufacturing field.

Firestone Workers Accept Contract

The Firestone local of the United Rubber Workers of America (CIO) on December 15 voted approval of a new contract with the Firestone Tire & Rubber Co. covering six paid holidays a year. The holiday schedule had previously been accepted by the Goodyear, Goodrich and U. S. Rubber locals. Negotiations between the union and company managements on a cost of living wage increase are expected to get under way in the near future.

U.S. RUBBER DEVELOPS IMPROVED MELTING EQUIPMENT FOR HIGHWAY JOINTS

Improved equipment for melting and pouring permanent seals in highway and airfield runway joints has been developed by the U. S. Rubber Co. Called the Sealz-Melter, it is designed for use with Sealz, the company's rubber compound that permanently seals joints in concrete against the ravages of weather.

The melter is of the double boiler type, one chamber inside the other. Oil heated to 450° F. and automatically controlled at that temperature circulates in the outer chamber. This principle prevents overheating and damaging the Sealz compound, which is loaded into the inner chamber. It holds three 50-pound bags of the material.

The melter operates on a continuous cycle, 50 pounds being added and withdrawn every twelve minutes. Thus none of the compound is exposed to the melting temperature for longer than 36 minutes during the regular melting operation. The oil bath can be brought up to temperature in one and one-half hours and the first three bags of compound can then be melted in about one-half hour. Whole 50-pound slabs of Sealz can be accommodated by the pot without being cut.

Heat is supplied by burning gas from pressure cylinders. A 100 pound cylinder will provide one week of normal operation. The contents are agitated continuously with a stirrer driven by a gasoline motor. Automatic temperature controls maintain set temperatures in the oil bath and in the melted material. The unit is insulated on all sides with premoulded insulating material.

Melted Sealz is withdrawn through a fully insulated valve seated in the oil bath chamber. It does not chill nor require supplementary heating to keep the material free flowing at all times.

A hand pouring pot has also been developed which pours a neat joint when operated by an inexperienced man. It does not waste material nor readily chill and clog.

According to Samuel P. Tauber, agent for the Sealz sealing compound, use of the compound eliminates the annual refilling of joints and increases surface life by many years, adding 10 cents to the value of every square yard of concrete highway or airfield strip laid. He also estimates that $10,000,000 in maintenance and repaving costs could be saved by protecting all of the country's 200 concrete surfaced airfields with the rubber-resin material. Similar protection of the country's 100,000 miles or more of concrete highways, he adds, would mean an economy of at least $100,000,000.

The Sealz pouring pot has a rubber nose which is dragged along the concrete joint, wipes the surface smooth, and prevents spoiling and wastage.

The automatic melting unit is of the double boiler type, the hollow walls being filled with oil which is heated by burning bottle gas.

Re-Elect 5 to RMA Board

Re-election of five members to the Board of directors of the Rubber Manufacturers Association was recently announced by that organization. The members re-elected for terms expiring in 1950 are: H. S. Marlor, Vice-President, United States Rubber Co., New York; C. D. Garretson, President, Electric Hose and Rubber Co., Wilmington, Del.; J. P. Seiberling, President, Seiberling Rubber Co., Akron, Ohio; Harry E. Smith, Vice-President, Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., and J. Newton Smith, President, Boston Woven Hose & Rubber Co., Cambridge, Mass. A. L. Viles, President of the Association, and all other officers, were re-elected at the annual meeting on December 11, held at the Hotel Waldorf-Astoria in New York City.

Plans New Chemical Plant

The General Chemical Division of the Allied Chemical & Dye Corp. is planning the construction of a multi-million dollar plant for the manufacture of industrial chemicals. The division has obtained an option on some 28 acres of land on River Road in the vicinity of Tonawanda, N. Y., and expects to start construction in the near future.

Tests on Brine Corrosion

Salt is commonly used by municipalities to control ice on wintry streets. Unfortunately, use of the salt invariably results in ragged fenders and weakened auto bodies as a result of the almost inevitable brine corrosion. Studies on this subject undertaken by the Goodyear Tire & Rubber Co. are reported to have proved that a solution of 20% salt and 2% sodium chromate or dichromate considerably inhibited the corrosion of low-carbon steel plate samples, and at the same time proved slightly beneficial to tires. At the end of 21 days of testing, both synthetic rubber and natural rubber exhibited little change in tensile and elongation. A slight toughening was noted, which is opposite from what is to be expected, since both natural and synthetic rubber normally show a slight loss of tensile strength with age and temperature. All tests were conducted at 100°F. They were carried out by Dr. H. A. Endres and Ward T. Van Orman.

Mechanical Goods Sales Increase

Mechanical goods sales of the Goodyear Tire & Rubber Co. were 20% higher in 1947 than in 1946, setting a new company record for peacetime output of industrial rubber products, according to H. D. Foster, manager of the mechanical goods division. Operations of the division, he said, will continue at capacity "as long as economic conditions remains as favorable as they are now." Only "must" projects are being started now in building, roads, dams and other public works construction, he said, but eventually the over-all program will require increased production of conveyor belts and allied mechanical goods.

Columbian Buys WAA Plant

The Columbian Carbon Co. has purchased the government-owned carbon black plant at Seagraves, Texas, for $1,420,000. The plant, which has been under lease by the company, is said to be one of the most completely equipped of the carbon black projects fostered by the government. It cost $2,226,179, and has an appraised fair value of $1,779,679. Situated on a tract of 236 acres, the plant includes 180 burner housers and 17 processing buildings. There are also 19 four-room frame homes on the site. The gas supply line is 12½ miles of 20-inch pipe conveying gas from a treater plant to the carbon black plant.

Rubber-Backed Wool Rug

Wearbest "Loma-Loom," a completely new rug construction which comprises carpeting permanently combined to a durable sponge rubber rug cushion, is now being marketed by Weil Bros., Inc., New York City. With all shock absorbed by the built-in rubber backing, tests show that wear is greatly reduced. The sponge rubber also acts as an insulating feature, keeping cold air from entering room, and preventing cold from floor coming to the rug surface.

Color Microscopy Process

Developed by Germain C. Crossman, Bausch & Lomb Optical Company scientist, a new microscopy technique providing a speedier, more accurate identification of a wide range of colorless, transparent substances without the use of dyes or light filters, is now a reality. Mr. Crossman explains that the light from the microscopic lamp is passed through a dark field substage lens to strike the sample at a high angle. The sample is covered with a high dispersion liquid that matches the light-bending ability of different materials in the sample at different portions of the color spectrum. Each material then scatters some of the colors present in the white light into the microscope where they are seen by the observer. The color microscopy process is expected to find wide use in various phases of industrial research.

Announce Merger of Companies

The merger of Robertshaw Thermostat Co., of Youngwood, Penna., the Fulton Sylphon Co., of Knoxville, Tenn., and the Bridgeport Thermostat Co., Inc., of Bridgeport, Conn., on September 25, 1947, under the name of Robertshaw-Fulton Controls Co., was recently announced. The new company with plants at Youngwood, Penna., Knoxville, Tenn., Bridgeport, Conn., St. Louis, Mo., and Lynwood, California, is the country's largest producer of seamless metal bellows and bellow devices, and gas and electric oven and water heater thermostats. It is also one of the largest producers of automatic temperature controls for heating, ventilating, air-conditioning and industrial process controls.

Polymerization of Vinyl Acetate

Polymerization of vinyl acetate as practiced in two leading German plants is described in a technical report recently made available. The report describes production at the I. G. Farbenindustrie plant at Hoechst and at the Alexander Wacker plant at Burghausen. Mimeographed copies of the report ("Polymerization of Vinyl Acetate," PB-78741, 52 pp.) sell for $1.50 each, and can be secured from the Office of Technical Services, Department of Commerce, Washington 25, D. C. OTS also has six other reports available covering vinyl acetate dispersions and various applications of vinyl acetate resins.

Industrial Rubber Wader

A new industrial rubber wader for use by workers in many damp, wet or muddy locations has been announced by the B. F. Goodrich Co., Akron, Ohio. Rubber used in the construction of the wader is said to have maximum abrasion resistance. The wader is made in one pattern with shoe sizes from 8 to 11 inclusive. All seams are cemented and strapped. Boots have a cleated sole and molded heel. The rubber suspended straps are equipped with quick operating buckles, and a bib front is provided for extra height. Strengthening rivets are employed at all tension points.

Oenslager is Goodyear Medalist

George Oenslager

George Oenslager, discoverer of organic accelerators and technical consultant to the B. F. Goodrich Co., has been selected to receive the Charles Goodyear Medal for 1948. The presentation will be made as part of the program of the banquet to be held by the Division of Rubber Chemistry, A.C.S., during its Spring Meeting at Chicago, Ill., next April.

Dr. Oenslager was born in Harrisburg, Penna., on September 25, 1873. He went to preparatory school in Harrisburg and then to Harvard, where he graduated with an A.B. degree in 1894. Following his graduation, he remained at Harvard as an instructor in organic chemistry and a graduate student for two years, earning his master's degree, and then went to Rumford, Maine, for the Warren Brothers Paper Co.

In May, 1905, Dr. Oenslager entered the laboratory of the Diamond Rubber Co. at Akron, Ohio. Although he had no previous rubber experience, his knowledge of chemistry was such that one of his first assignments was a study of means by which cheap wild rubber could be made to vulcanize as rapidly as those of higher quality, and to give as good a product. Within six months, he found two organic compounds which shortened the time of vulcanization and which improved the quality of wild rubber. After a year, his studies included hundreds of compounds. For these achievements, he was awarded the Perkin Medal in 1933.

Another one of Dr. Oenslager's activities was work on the development of carbon black in tire treads and other surfaces subjected to wear. In some quarters he is credited, above any other individual, with the successful application of carbon black in tire treads. Much of the early development in the use of stearic acid was also performed by this untiring chemist.

Dr. Oenslager remained active with the B. F. Goodrich Co., which acquired the Diamond Rubber Co., up to the time of his retirement. At present, he acts in a consulting capacity from time to time. He has been a member of the A.C.S. since 1910 and the American Institute of Chemical Engineers since 1916.

Foam Rubber Seat Cushions

The U. S. Rubber Co. is presently engaged in the development of a new-type foam rubber seat cushion for passenger cars, that the company claims will go even further in the use of rubber for passenger comfort. The company has developed a car seat and seat back consisting of an air bag overlaid by a layer of foam rubber. The air bag is constructed of dipped latex formed over a mold into a series of lobes which are attached to and interconnected through a flat top section. A jute insulator and a layer of foam rubber are placed between the air bag and the upholstery cloth covering. The bag is inflated through a valve. Normal pressure ranges from 3 to 6 oz. According to company officials, some cars may use the cushion within the next year. U. S. Rubber is planning to manufacture the units in a new plant at Chicago, Illinois.

Plastic Coating for Belting

The availability of a new type of plastic coating for use on rubber, rubber belting, and cotton belting, has been announced by the Amercoat Division of the American Pipe & Construction Co., Los Angeles 54, Calif. The new material is said to combine the properties of synthetic rubber with the chemical resistance of vinyl resins. Known as Amercoat No. 40, the coating will stand continuous flexing and is said to have excellent adhesion to rubber, canvas, metal, concrete and wood after the surface has been properly prepared. It is especially recommended by the company for conveyor and other belting subject to abrasion, spillage of water, grease, oil, and other chemical solutions and cleaning agents.

Gilmer Timing Belt

A belt with rubber teeth that will not slip has been announced by the L. H. Gilmer Division of the U. S. Rubber Co. The new belt is said to be enormously strong, highly flexible and virtually noiseless in operation. It is designed for use one machinery equipped with special pulleys grooved to fit the teeth. The belt is reinforced with steel cables embedded in oil-resisting synthetic rubber. In operation, the belt makes positive engagement with the pulleys at any speed up to 10,000 feet per minute. Known as the Gilmer Timing Belt, the new product will be made in various sizes to meet the requirements of machine designers.

Organize Merit Rubber Co.

The Merit Rubber Company was recently organized at 165 North Union St., Akron 4, Ohio. The company plans the manufacture of various types of molded goods and is currently specializing on bicycle grips. Officers of the new company include E. M. Scharenberg, president; James E. Rand, vice-president, and D. E. Richard, secretary-treasurer.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers are produced only at the request of the consumers with 20 bales of the original run set aside for distribution to other interested companies for their evaluation. Such rubber is available in quantities of one or two bales upon request to the Sales Division of Rubber Reserve within six months after the experimental polymer was produced. Subsequent production runs are made if sufficient requests are received to warrant it.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X-419 GR-S	General, Baytown	Jan., 1948	A 50 part Philblack A latex masterbatch with 100 parts of GR-S having a Mooney of 37 ± 4 and stabilized with 1.25 parts Stalite.	A non-staining type latex masterbatch of an HMF black. Should have the excellent processing and physical properties usually attained with this type black. Should be of unusual interest for all kinds of mechanical goods, etc. Similar masterbatch with EPC black was made as X-413-GR-S.
X-420 GR-S	General, Baytown	12/12/47	A 50 part Philblack O latex masterbatch with 100 parts of GR-S having a Mooney of 37 ± 4 and stabilized with 1.25 parts of PBNA, otherwise similar to GR-S-Black 1.	A GR-S-Black 1 type masterbatch containing a new very fine furnace black attributed to impart approximately equivalent tread wear and better processing than EPC black. All consumers interested in evaluation lots up to 5000 pounds should advise the Sales Division of Rubber Reserve immediately.
X-421 GR-S	Firestone, Lake Charles	Jan. or Feb., 1948	A 25 to 35 Mooney GR-S-AC (alum coagulation) modified with tertiary C-16 mercaptan and stabilized with 1.5 parts of UBUB.	This non-staining, non-discoloring GR-S will be similar to X-415-GR-S except for stabilization and should be superior to X-415 in these above noted properties. Scheduled primarily for chemically blown sponge but should offer improved processing (reduced breakdown costs) for practically all applications now using GR-S-20AC and GR-S-45AC.
X-422 GR-S	U. S. Rubber, Borger	12/9/47	GR-S-17 shortstopped with hydroquinone.	The present shortstopper being used with EFED (non-staining and non-discoloring) GR-S is causing excessive corrosion in plant equipment. Similar steps may be necessary with other EFED types such as GR-S-25, GR-S-40AC and GR-S-45AC in very near future.
X-423 GR-S	Goodyear, Houston	12/8/47	X-385-GR-S (Standard GR-S stabilized with 1.5 parts R-2015) shortstopped with hydroquinone.	This non-staining, non-discoloring type GR-S being made to combat excessive corrosion to plant equipment as indicated under X-422-GR-S.
X-424 GR-S	Goodyear, Torrance	12/12/47	Standard GR-S except that fatty acid soap and conversion will be reduced and Mooney increased to about 65. PBNA used as stabilizer.	Higher Mooney GR-S appears to give better tread wear and lower conversion usually results in improved processing. To be evaluated in tires.
X-425 GR-S	Goodyear, Torrance	12/12/47	GR-S-10 except that rosin soap and conversion will be reduced and Mooney increased to about 65. PBNA used as stabilizer.	Higher Mooney GR-S appears to give better tread wear and lower conversion usually results in improved processing. To be evaluated in tires.
X-426 GR-S	Firestone, Lake Charles	12/11/47	GR-S-AC except that Stalite will be used as the stabilizer.	Replacement for GR-S-AC as a result of serious PBNA shortage. Consumers normally using GR-S-AC are urged to use X-426-GR-S wherever possible. May offer advantages in those applications where alum coagulated GR-S is desired with relatively non-staining characteristics. Will have low water absorption and other properties similar to GR-S-AC.

Clay Company Changes Name

P .W. Martin Gordon Clays, Inc., of 33 Rector St., New York 6, N. Y., for many years the producing unit for Moore & Munger, and which, since August 1, 1947, has operated under a policy of direct sales to customers, has announced a change in corporate name to Southern Clays, Inc. Offices will be maintained at the same address. Plant personnel in Georgia has not changed, and the sales structure of the company remains as heretofore with W. H. Shields as sales manager and E. W. Schwartz as technical representative.

Increase Carbon Black Prices

Carbon black manufacturers have announced an increase in all types of channel carbon blacks for the first quarter of the current year. The increase amounted to one-half cent a pound in carload lots and one full cent a pound on deliveries of small lots. The new price is .0682 to .1125 cents per pound in bags as compared with the previous quotation of .0632 to .1025 per pound. No change in furnace carbon black prices was announced.

Handling Foamex Matresses

Sealy, Inc., of Akron, Ohio, manufacturers and marketers of Sealy sleeping equipment, will be the first to introduce in the postwar mattress market Foamex cushioning material produced by the Firestone Industrial Products Co., it was recently announced. Until recently, the limitation of natural latex made it necessary to channel Foamex production into essential uses. The new mattresses will be available through Sealy manufacturers covering every major metropolitan district in the country.

STATEX-93

Fine enough to contribute reinforcement in blends with channel black.

Ideal in undertreads and sidewalls.

Conserves channel black and reduces cost.

COLUMBIAN CARBON COMPANY

A COLUMBIAN COLLOID

500 TONS OF SMOKE A DAY

COLUMBIAN CARBON CO. MANUFACTURER

BINNEY & SMITH CO. DISTRIBUTOR

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

VFF (Very Fine Furnace)

STATEX-K

◆

FF (Fine Furnace)

STATEX-B

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

◆

COLUMBIAN CARBON CO. — MANUFACTURER

BINNEY & SMITH CO. — DISTRIBUTOR

BIOGRAPHIES OF OFFICERS OF ACS DIVISION OF RUBBER CHEMISTRY

As reported in our October, 1947, issue, officers for the 1947-48 season of the Division of Rubber Chemistry, American Chemical Society, were recently elected, as follows: *Chairman,* Harry E. Outcault, assistant sales manager, Zinc Oxide Department, St. Joseph Lead Co., New York, N.Y.; *Vice-Chairman,* Dr. Howard I. Cramer, director of development, Sharples Chemicals Inc., Philadelphia, Penna.; *Secretary,* Charles R. Haynes, manager, rubber service, Binney & Smith Co., New York, N.Y.; *Treasurer,* C. W. Christensen, sales manager, Rubber Service Laboratories Division, Monsanto Chemical Co., Akron, Ohio. Biographies of these men follow herewith:

Harry E. Outcault: Born at Basil, Ohio, on April 4, 1895. Mr. Outcault studied at Ohio Wesleyan University and Ohio State University, receiving the degree of Bachelor of Chemical Engineering from the latter university in 1917. After serving for a short while with the U. S. Bureau of Mines in 1918 he served as a second lieutenant in the Chemical Warfare Service in 1918-19. During 1919-20 he was in charge of lamp life tests at the Edison Lamp Works of the General Electric Co. at Harrison, N.J.

After two years with the Perth Amboy Chemical Works in the 1920-22 period, Mr. Outcault joined the staff of the N. J. Zinc Co. at Palmerton, Penna., and in 1927 was transferred to the New York office in charge of technical service to the rubber industry. He joined the St. Joseph Lead Co. in 1931 in charge of technical service for the zinc oxide department and was named assistant sales manager of the department in 1946.

A member of the American Ceramic Society, the A.S.T.M., and the National Paint, Varnish and Lacquer Association, Mr. Outcault is also a former chairman of the New York Rubber Group and of the New York Section of the American Institute of Chemical Engineers. He has contributed several articles on zinc oxide to the technical literature. He lives in Summit, N. J.

Harry E. Outcault

Howard I. Cramer: Born in Akron, Ohio, in 1904, Dr. Cramer grew up on a farm north of Akron and graduated from Western Reserve Academy in Hudson. He received a B.S. from the University of Akron in 1926 and his M.S. in 1928 and Ph.D. in 1929 from the University of Wisconsin. From 1929 to 1933 he was associated with the Goodyear Tire & Rubber Co. as a research chemist and from 1933 to 1941 was with the University of Akron as Associate Professor in Charge of Rubber Chemistry. He joined Sharples Chemicals Inc. in the latter part of 1941 and was named director of development in 1944.

Dr. Cramer has written many articles dealing with the syntheses of rubber accelerators and antioxidants and of raw materials for these products through catalytic hydrogenation. Other articles have dealt with the oxygen content of natural rubber. From 1937 to 1946 he served as secretary of the Rubber Division and has been a member of various committees.

Charles R. Haynes: Associated with the Binney & Smith Co. since 1935, Mr. Haynes received a B.Ch.E. degree from the Massachusetts Institute of Technology in 1904. Before joining Binney & Smith he had a long career in the rubber manufacturing field, as chemist for the Boston Rubber Shoe Co., foreman and research chemist for the Boston Woven Hose & Rubber Co., chief chemist and assistant superintendent for the Mechanical Rubber Co., and factory manager for the Goodyear Metallic Shoe Co.

Just prior to his present connection Mr. Haynes was associated with the U. S. Rubber Co., serving as assistant purchasing agent in New York, latex development in Naugatuck, and hose development in Passaic. Mr. Haynes is the author of numerous papers dealing with the chemistry and application of carbon blacks.

C. W. Christensen: A graduate of the University of Akron, where he received his B.S. degree in 1922, Mr. Christensen has spent his entire life in the rubber field. He joined the Rubber Service Laboratories shortly after receiving his degree and remained with that organization when it was acquired by the Monsanto Chemical Co. which now operates it as the Rubber Service Laboratories Division. For many years he was engaged in compounding and sales development work with the division, but in recent years has served as sales manager of it. His activities with the Rubber Division are also of long term tenure. From 1934 to 1938 he served as secretary-treasurer. Since 1938 he has continued to serve as treasurer.

Howard I. Cramer

Charles R. Haynes

C. W. Christensen

NEW YORK RUBBER GROUP ELECTS OFFICERS FOR 1948

The election of officers for the 1948 season was the only serious business on the agenda at the Annual Christmas Meeting and Party of the New York Rubber Group, held at the Hotel McAlpin in New York City on December 12. Approximately 450 members and guests attended the meeting, which featured a cocktail hour, dinner, entertainment and the distribution of lucky number prizes.

Joseph E. Waters, of the General Cable Corp., formerly vice-chairman of the group, was elected as chairman, and Pete Murawski, technical sales representative of the DuPont Rubber Chemicals Department, was elected as vice-chairman. Peter P. Pinto (RUBBER AGE) was elected secretary-treasurer, and Howard Ling (Naugatuck Chemical) as sergeant-at-arms.

In accordance with a decision reached by the Executive Committee, and approved during the meeting by the membership, it was decided to increase the membership of that committee from 11 to 14 members, consisting of twelve members (four each elected to one, two and three year terms, respectively) and two ex-officio members (the retiring chairman and secretary-treasurer).

Elected to full three-year terms were the following: G. A. Provost (U. S. Rubber), M. R. Buffington (Lea Fabrics), John Hamilton (Binney & Smith), and J. A. Corrigall (Vanderbilt). B. M. Fairbank (General Electric) was elected for a one-year term, and A. E. Powell (Pioneer Latex) to a two-year term, bringing those groups up to four members each. The Nominating Committee was headed by George Wyrough (Phillips Petroleum) as chairman, and included E. S. Kern (Vanderbilt), Emil Schwartz (Southern Clays), and B. B. Wilson (*India Rubber World*).

During the dinner period, Howard I. Cramer (Sharples Chemicals), recently elected as vice-chairman of the Rubber Division, A.C.S., was introduced, as was P. L. Wormeley, of the National Bureau of Standards who has retired after some twenty-five years of service. A testimonial dinner was tendered to Dr. Wormeley by the Rubber Manufacturers Association earlier in the week.

Entertainment at the meeting consisted of a number of variety acts, all of which were well received. The main feature of the evening was the distribution of some 135 prizes, made possible by donations received from the following concerns:

Adamson United Co., L. Albert & Son, Aluminum Flake Co., American Cyanamid Co., American Resinous Chemical Corp., American Zinc Sales Co., Barrett, Binney & Smith Co., Black Rock Mfg. Co., Stewart Bolling & Co., Godfrey L. Cabot, Inc., John H. Calo Co., Cambridge Instrument Co., R. E. Carroll, Inc., Carter Bell Mfg. Co., Cleveland Liner & Mfg. Co., Continental Carbon Co., Cooke Color & Chemical Co., DuPont, Enjay Co., Erie Engine & Mfg. Co., Farrel-Birmingham, Inc., Flintkote Co., General Atlas Carbon Co., General Magnesite & Magnesia Co., B. F. Goodrich Chemical Co.

Also, C. P. Hall Co., Hardesty Chemical Co., Harwick Standard Chemical Co., Hercules Powder Co., Herron Bros. & Meyer, J. M. Huber Corp., *India Rubber World*, Intercontinental Rubber Co., I. B. Kleinert Rubber Co., Lea Fabrics, Inc., P. W. Martin Gordon Clays, Inc., McNeil Machine & Engineering Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., National Rubber Machinery Co., National Sherardizing & Machine Co., Naugatuck Chemical, Neville Co., N. J. Zinc Co., Pennsylvania Industrial Chemical Corp., Pequanoc Rubber Co., Phillips Petroleum Co., Rare Metal Products Co., Revertex Corp. of America, H. M. Royal, Inc., RUBBER AGE.

Also, St. Joseph Lead Co., A. Schrader's Son, A. Schulman, Inc., Scott Testers, Inc., Sharples Chemicals Inc., Shell Oil Co., Southeastern Clay Co., Speed Products Co., Stamford Rubber Supply Co., Stauffer Chemical Co., Sun Oil Co., Tanney-Costello, Inc., Textile Proofers, Inc., Thiokol Corp., Thompson, Weinman & Co., Wm. R. Thropp & Sons Co., Titanium Pigment Corp., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Vansul & Co., Webber & Smith, C. K. Williams & Co., Wilmington Chemical Corp., Charles T. Wilson Co., Witco Chemical Co., Xylos Rubber Co.

Use of Isotopes

According to Dr. F. A. Long, of the Chemistry Department, the Botany Department of Cornell University, Ithaca, N. Y., is devising ways and means of using radio-active isotopes in connection with rubber plants to determine how such plants produce their rubber. No indication was given as to how the isotopes would be applied. Isotopes, sometimes called radio-active tracers, are atoms that give off radiations and can be detected and counted.

Chicago to Hold Symposium

The next meeting of the Chicago Rubber Group, to be held on February 6 at the Hotel Morrison in Chicago, Ill., will feature a Symposium on Carbon Black, with members of the technical staffs of both the Columbian Carbon Co. and the Binney & Smith Co. participating. J. W. Snyder will discuss the basic carbon properties, including some of the newer aspects of electron microscope work. H. A. Brindley will deliver a talk on "Some Compounding and Processing Suggestions for Furnace Carbon in Natural Rubber." Charles R. Haynes will discuss specialty compounding of the furnace carbons in footwear, mechanical goods, and wire and cable formulations. A capacity attendance is anticipated.

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QUEBEC RUBBER GROUP HEARS TALK ON ELECTRIC HEATING

J. C. Reid, industrial heating engineer of the Canadian General Electric Co., was the principal speaker at the meeting of the Quebec Rubber & Plastics Group, held on December 18 at the Ritz-Carlton Hotel in Montreal. This meeting was originally scheduled for December 11, but was moved ahead one week because of a mix-up in hotel reservations.

Speaking on "Electric Heat in the Plastics Industry," Mr. Reid discussed process heating in general, including the heating of molds, dies, varnish kettles, etc. Under this grouping such equipment as immersion heaters, strip heaters, cartridge heaters, infra-red equipment, control panels and thermostats were mentioned.

Reactrol control, whereby the voltage is varied in response to the demand of the load was also discussed, and particular reference was made to the straight line control of Dowtherm heating systems in the resin and varnish industry. Atmosphere converters for supplying inert or reducing gases for blankets over varnish kettles were also covered in some detail.

Mr. Reid made mention of the heating applications in the processing of equipment used in the industry, such as annealing, hardening, carburizing and other heat treating operations. Particular reference was made to those heat treating operations using controlled atmosphere furnaces, Ajax-Hultgren Salt baths and high frequency heating.

Slides were shown covering the General Electric atmosphere type furnaces, electrode type salt baths, particularly the sodium hydride process of descaling and the cleaning of rubber and glass molds in caustic nitrate baths. A few slides were shown on high frequency hardening operations as well as dielectric heating.

Some reference was made by the speaker to the favorable position of electric heat in Canadian industry. The large use of electric power, particularly from large hydro-electric developments, has brought about very favorable rates which should warrant more extensive use of this advantageous method of heating.

The Canadian picture is somewhat in reverse of the American set-up, in that Canada has relatively cheaper hydro-electric power, while the United States enjoys cheaper coal, gas and oil. Mr. Reid claimed that this has proved to be a considerable advantage to Canadian industry, because hydro-electric power means greater economy, more accurate control, and the utilization of less floor space.

Following the main talk the General-Electric sound slide film, "Infra-Red Lamps for Better Production," was shown.

Rubber Drums Again Available

Rubber drums, which achieved great popularity before the war, are now again available through the Maurice A. Knight Co., Akron, Ohio. The 13 gallon drums are made of seamless, all-rubber construction and are approved for the shipment of muriatic, hydrofluoric and up to 47% sulfuric acids. The drums are manufactured by the General Tire & Rubber Co.

820 MEMBERS AND GUESTS ATTEND CHICAGO XMAS PARTY

Approximately 820 members and guests attended the annual Christmas party of the Chicago Rubber Group, held at the Morrison Hotel, in Chicago, Illinois, on December 19. This was the largest attendance at a Christmas party in the history of the group.

The record turnout was due to the efforts of the Christmas Party Committee under the chairmanship of W. H. Lussie (Vanderbilt). Other committee members included: Paul Van Cleef (Van Cleef Bros.), Warren Bickel (Diamond Wire & Cable), Ralph Anschuetz (Witco), Douglas P. Johnstone (Douglas P. Johnstone Co.), Robert L. Campbell and James P. Sheridan (New Jersey Zinc), Harry L. Anderson (Mepham Corp.), and Alfred L. Stein (Muehlstein).

The banquet was preceded by a general cocktail hour which was augmented by special parties given by several suppliers. Selected vaudeville acts followed. The festivities were concluded with dancing. Lady guests received scarves of pure silk and rayon as party favors. The following manufacturers and raw material suppliers generously contributed to the success of the banquet:

Adamson United Co., L. Albert & Son, Allied Chemical & Dye Corp., Allis Rubber Corp., American Can Co., American Container Corp., American Industrial Rubber Co., American Mineral Spirits Co., American Roller Co., American Zinc Sales Co., Anchor Rubber Mfg. Co., Anderson-Bolling Mfg. Co., Binney & Smith Co., Stewart Bolling & Co., Brown Rubber Co., Godfrey L. Cabot, Inc., Calco Chemical Division of American Cyanamid Co.

Also, Philip E. Calo Co., Inc., Carter Bell Mfg. Co., Central Rubber & Mfg. Co., Chemical By-Products Co., Chicago Cutting Die Co., Chicago Show Printing Co., Cleveland Liner & Mfg. Co., E. W. College, Commerce Petroleum Co., Commercial Solvents Corp., Cupples Co., Darling & Co., T. A. Desmond & Co., Diamond Wire & Cable Co., Dryden Rubber Co., E. I. du Pont de Nemours & Co., Eagle Picher Sales Co., Enjay Co., Erie Engine & Mfg. Co.

Also, Farrel-Birmingham Co., Felt Products Mfg. Co., Frost Rubber Works, General Magnesite & Magnesia Co., Genseke Bros., B. F. Goodrich Chemical Co., Great Lakes Solvents, Inc., S. C. Johnson & Sons, Inc., C. P. Hall Co., Harwick Standard Chemical Co., Herron & Meyer Co., William J. Hough Co., J. M. Huber, Inc., Ideal Roller & Mfg. Co., Imperial Paper & Color Corp., *India Rubber World,* Industrial Rubber Goods Co., Inland Rubber Corp.

Also, Douglas P. Johnstone, Kraft Chemical Co., LaJone Rubber & Mfg. Co., Lake Shore Tire & Rubber Co., Marbon Corp., P. W. Martin Gordon Clays, Maywood Mold & Machine Co., McNeil Machine & Engineering Co., George S. Mepham Corp., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., National Sheradizing & Machine Co., National Standard Co., Naugatuck Chemical, New Jersey Zinc Sales Co., Ohio-Apex, Inc.

Also, Palmer Asbestos & Rubber Corp., Pequanoc Rubber Co., Phillips Petroleum Co., Phoenix Mfg. Co., Pittsburgh Plate Glass Co., R.B.H. Dispersions, Inc., Rainfair, Inc., Rapid Roller Co., Resinous Products & Chemical Co., Rexhide Mfg. Co., Roth Rubber Co., RUBBER AGE, Rubber Manufacturers Association, W. H. Salisbury & Co., A. Schrader's Sons, A. Schulman, Inc., Scott Testers, Inc., Sears Roebuck & Co.

Also, Sharples Chemicals Inc., Sherwin-Williams Co., Southeastern Clay Co., Standard Rubber Supply Co., Standard Oil Co. of Indiana, Stauffer Chemical Co., Thiokol Corp., Titanium Pigment Corp., Union Asbestos & Rubber Co., United Carbon Co., U. S. Rubber Reclaiming Co., Van Cleef Bros., Inc., R. T. Vanderbilt Co., Victor Mfg. & Gasket Co., Wear Proof Mat Co., Western Felt Works, Williams Bowman Rubber Co., Witco Chemical Co., Xylos Rubber Co.

Southern Ohio Elects Officers

Results of the election by letter ballot of officers and directors of the Southern Ohio Rubber Group for 1948 were recently announced. The new officers are: *Chairman,* R. S. Radow (Dayton Rubber); *Vice-Chairman,* J. L. Fitzgerald (Premier Rubber); *Treasurer,* H. H. Wolfe (Dayton Rubber); *Secretary,* R. J. Hoskin (Inland). Members elected as Directors for three years are: G. W. Yohe (Inland), A. J. Marshall (Naugatuck Chemical), and H. R. Gill (Goodyear). Members previously elected as Directors with two years in office remaining are: H. E. Wening (Inland), Joseph Rockoff (Dayton), and E. C. Dill (Inland). Members with one year remaining as Directors, include: S. L. Brams (Dayton Chemical Products), H. W. Bell (Firestone, Nobleville), and R. B. Appleby (DuPont, Akron).

A report on "Bale Packing of Rubber" (Circular No. 24) has been issued by the Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S. Conditions which the ideal method of packing rubber must meet are outlined. Copies are available on request from the Institute.

DETROIT RUBBER GROUP ELECTS SELHEIMER AS 1948 CHAIRMAN

Dr. C. W. Selheimer, associated with the Detroit plant of the U. S. Rubber Co., was elected chairman of the Detroit Rubber & Plastics Group at the annual Christmas Party of that group, held at the Detroit-Leland Hotel in Detroit on December 12. W. F. Davies, of the Kaiser-Frazer Corp., was elected vice-chairman. E. J. Kvet (Baldwin Rubber) was re-elected treasurer, and J. C. Dudley (Chrysler) was elected secretary.

Several committee chairmen were also elected at the meeting, as follows: *Membership,* G. F. Lindner (Minnesota Mining); *Program,* Dr. G. M. Wolf (Sharples Chemicals); *Publicity,* T. Halloran (Chemical Products). The following were elected as members of the Executive Committee: J. B. Wilson (Ford), R. J. Shroyer (Vanderbilt), A. C. Nixon (Fisher Body), F. Haushalter (Firestone), and G. Horsfull (American Cyanamid).

The annual event was held as a joint dinner meeting with the Society of Plastics Engineers, and approximately 275 members and guests of both groups enjoyed a steak or fish dinner.

J. P. Welsh, the "Old AAA Traveler" of the Auotmobile Club of Michigan entertained the group by relating unusual experiences gathered in more of 35 years of travel. Following Mr. Welsh's talk, the group was entertained by several musical and acrobatic acts. The meeting closed with the distribution of a large number of prizes. Donations which added greatly to the success of the party were received from the following:

Acadia Synthetic Products Co., Advance Solvents and Chemical Co., Akron Chemical Co., L. Albert and Son, Baldwin Rubber Co., Barrett, Carter Bell Mfg. Co., Binney and Smith Co., Brown Rubber Co., Godfrey L. Cabot, Inc., Central Rubber and Steel Corp., Cleveland Liner and Mfg. Co.

Also, Dow Chemical Co., Dow-Corning Co., Duffy Mfg. Co., E. I. duPont de Nemours & Co., Enjay Co., Evans-Winter-Hebb Co., Flintkote Co., General Tire & Rubber Co., B. F. Goodrich Chemical Co., Goodyear Tire & Rubber Co., Goshen Rubber Co., C. P. Hall Co., Harwick Standard Chemical Co., Hercules Powder Co., Herron Bros. & Meyer, Hewitt Rubber, J. M. Huber Co.

Also, *India Rubber World,* Industrial Rubber Goods Co., Manhattan Rubber, Midwest Rubber Reclaiming Co., Minnesota Mining & Mfg. Co., Monarch Rubber Co., Monsanto Chemical Co., H. Muehlstein and Co., F. F. Myers Co., Naugatuck Chemical, New Jersey Zinc Co., Pequanoc Rubber Co., Phillips Petroleum Co., Piqua Stone Products, Reichold Chemical Co., RUBBER AGE.

Also A. Schulman, Inc., Scott Testers, Inc., Sharples Chemicals Inc., Stamford Rubber Supply, Standard Products Co., Sun Rubber Co., Tanney-Costello, Inc., Thiokol Corp., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., C. K. Williams Co., Witco Chemical Co., J. J. White Products Co., Xylos Rubber Co. and Yale Rubber Co.

PATRICK, CAPEN AND SUTTON HEAD BOSTON RUBBER GROUP

Approximately 400 members and guests attended the Winter Meeting and Christmas Party of the Boston Rubber Group, held at the Somerset Hotel in Boston on December 12. The meeting featured election of new officers, a talk on synthetic rubber, a program of entertainment, and the distribution of prizes to holders of lucky numbers. It was announced that paid membership by the time of the meeting had reached 651.

Officers elected for the 1948 season were as follows: *Chairman,* Richard K. Patrick (Vulplex); *Vice-Chairman,* Bernard H. Capen (Tyer Rubber); *Secretary-Treasurer,* Harry W. Sutton (Boston Woven Hose). The following were elected as members of the Executive Committee: Charles E. Reynolds (Odell), Thomas C. Edwards (Acushnet Process), and Ralph McCurdy (Hood Rubber). Harold P. Fuller (Pequanoc Rubber) continues as permanent historian.

The talk on synthetic rubber was delivered by William F. Tuley, operations manager, Synthetic Rubber Division, U. S. Rubber Co. Taking as his subject "GR-S in Consumer Products," Dr. Tuley stated that synthetic rubber is rapidly progressing from the status of a substitute material to an established commodity used by manufacturers of rubber products because of its cost and quality values.

There are now over 400 experimental GR-S latex and dry rubber polymers which have been approved by Rubber Reserve for plant production, he said. Nearly 40 of these are in regular production. These represent variations in processing qualities, physical properties in the finished products, variations in staining and discoloration and appearance.

Mr. Tuley claimed that certain developments now nearing commercial application give promise of such an improvement that synthetic rubber may surpass natural rubber in durability in first quality tire treads. There can no longer be any question of the value of GR-S when its use is directed by a combination of intelligent and skilled technology, he said.

Trend in Rubber Industry

According to the annual review of electrical and allied developments issued by the General Electric Co., there was a definite trend in 1947 toward the use of completely electrified calender trains for processing rubber fabrics. Individual electric-motor drives were used in a large number of installations to supersede mechanical drives formerly used to drive various auxiliary units in complete calendering units. A primary advantage of electric drives is said to be their ability to maintain any desired constant tension at various points in the complete train. Tension control results in more uniform fabric quality, and in a decided reduction in fabric spoilage. The relatively new field of calendering of polyvinyl chloride sheeting and film was said to have benefited during the year by the development of new types of electronically-controlled calender drives.

Rubber Pipe Replaces Metal

Rubber pipe, developed by hose engineers of Goodyear Tire & Rubber Co.'s mechanical goods division, has been installed successfully in an Ohio coal mine to replace a 600-foot metal pipe line used in ejecting acidic water. Especially compounded to conduct corrosive chemicals, the rubber pipe was installed in a single line of eight sections, totaling 380 feet and running from the pump up through an air shaft to discharge above ground. Flexibility of the hose, called Diverspipe, permitted use of the air shaft route, shortening the old line by 220 feet. Goodyear engineers believe that this is the first time rubber-hose pipe has been installed in an underground mine for an operation of this type.

Meeting Plans Progressing

Plans are progressing in connection with the Spring Meeting of the Division of Rubber Chemistry, A.C.S., which will be held at the Hotel Sherman in Chicago, Ill., on April 21, 22 and 23. It has been announced that reservations for the hotel should be made by applying direct to John Nolan, Convention Department, Hotel Sherman, Chicago, Ill. R. C. Dale (Inland Rubber) has been named chairman in charge of all local arrangements, and it is planned to hold the usual banquet in the Sherman on Thursday night, April 22, following a general cocktail party. The latter is being arranged by a committee of suppliers, headed by C. M. Baldwin as chairman. The Rubber Division is cooperating as usual with the High Polymer Forum, which will hold its meetings during the same week the Division meets, as a separate division. Dr. M. L. Huggins, of the Eastman Kodak Co., Rochester, N. Y., is chairman of the Forum. It has also been announced that the Fall Meeting of the Rubber Division will not be held with the parent society, but will be held in Detroit, Mich., on November 8-10, with headquarters at the Book Cadillac Hotel.

Reclaimers Elect New Officers

Following its regular annual meeting, held on January 6 in New York City, the Rubber Reclaimers Association announced that Carl R. Shaffer, president of the Xylos Rubber Co., has been elected president of the association for the year of 1948. H. S. Royce (Boston Woven Hose) was elected vice-president, and Charles T. Jansen (RUBBER AGE) was re-elected secretary-treasurer. Jean H. Nesbit (U. S. Rubber Reclaiming) will again head the Executive Committee. Allyn I. Brandt (Goodrich Chemical), for many years an active participant in association affairs but who no longer has occasion to deal with reclaimed rubber, was elected an honorary member.

TWO PANEL DISCUSSIONS TO BE SPONSORED BY AKRON GROUP

The Akron Rubber Group meeting on Friday, February 6, 1948, at the Mayflower Hotel, Akron, Ohio, will feature two panel discussions at a late afternoon session preceding the usual dinner.

At 4:15 p.m,, Carey Mann, manager of the engineering and service department of the Cleveland division of the Westinghouse Electric Corp., will speak on "Application of High-Frequency Dielectric Heating to Rubber and Plastics." Other speakers on the panel will include G. P. Bosomworth, manager of the engineering laboratory, Firestone Tire & Rubber Co., and H. G. Shively, manager of electronic applications, B. F. Goodrich Co.

At 5:15 p.m. the second panel will begin discussions on "Injection Methods of Molding." Chief speaker will be D. F. Fraser, manager of the rubber division of the Monroe Auto Equipment Co. Other speakers on this panel will include John F. McWhorter, research engineer for the Ohio Rubber Co.; Howard Dodge, general manager of the Wabash, Indiana, plant of the General Tire & Rubber Co.; Herman Boxser, chief chemist, Acadia Synthetic Products Division, Western Felt Works; and J. L. Woodruff, development engineer for agricultural and dairy products, Gates Rubber Co.

Dinner at 7:15 p.m. will follow the two panel discussions. Following the dinner, Robert C. Clark of the Ohio Bell Telephone Co. will present a demonstration on "New Developments in Communications," showing such new items as scrambled speech, radar, micro-waves, jump-jump transmission, coaxial cables and television.

Buffalo Elects Officers

Election of officers featured the annual Christmas Party of the Buffalo Rubber Group held on December 9 at the Westbrook Hotel in Buffalo, N. Y. The following officers were elected. *Chairman,* E. R. Briggs (Hewitt-Robins); *Vice-Chairman,* Wayne Nelson (American Container); *Secretary-Treasurer,* Russel Shultz (U. S. Rubber Reclaiming). The following were elected to the Executive Board: John Augenstein, Wilbur Parsons, Robert Thom, A. H. Davis, H. J. Deney, E. C. Silverson, and Burt Wetherbee. Following the election of officers the group saw a program of entertainment. Door prizes were distributed at the end of the evening.

Resins Research Laboratory

The C. J. Osborn Co., 132 Nassau Street, New York City, has opened a new laboratory building on the plant site of the company at Linden, New Jersey. Research on resins and pigment dispersions will be carried on with expanded facilities for service to the rubber, surface coatings, ink and related industries. All the technical personnel of the company will henceforth occupy the new quarters. The building will house technical executive offices, a library, and chemical laboratories for product development, application research, technical service and physical testing.

SOUTHERN OHIO RUBBER GROUP HOLDS GALA CHRISTMAS MEETING

The Southern Ohio Rubber Group held a gala Christmas Meeting on December 18 at the Miami Valley Country Club in Dayton, Ohio. The evening was devoted purely to social activity, which included entertainment, dancing and cards. Special door prizes were awarded to male members and guests holding lucky number tickets, while a Koroseal raincoat was presented to each lady attending the party. The prizes were made possible by donations received from the following companies:

Adamson United Co., Advance Solvents & Chemical Co., Akron Chemical Co., Amsco Products Co., Barrett, B. F. Goodrich Chemical Co., Binney & Smith Co., Black Rock Mfg. Co., Stewart Bolling & Co., Calco Chemical, Carl Cramer Co., Carter-Bell Mfg. Co., C. P. Hall Co., Cleveland Liner & Mfg. Co., Continental Carbon Co., DuBois Co., Durez Plastics & Chemicals, Inc., Enjay Co., E. I. du Pont de Nemours & Co., Forbes Varnish, Givaudan-Delawanna, Inc., Godfrey L. Cabot, Inc.

Also, Harwick Standard Chemical Co., Herron Bros. & Meyer, H. Muehlstein & Co., Irvington Varnish & Insulator Co., J. J. White Products Co., J. M. Huber, Inc., Mansfield Paint Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., Naugatuck Chemical, New Jersey Zinc Sales Co., Ohio-Apex, Inc., Ohio Oil Co.

Also, Pennsylvania Industrial Chemical Corp., Pequanoc Rubber Co., Phillips Petroleum Co., Plastic & Rubber Products, Inc., Precision Scientific Co., Premier Rubber Mfg. Co., RUBBER AGE, Sharples Chemicals Inc., Stamford Rubber Supply Corp., U. S. Rubber Reclaiming Co., and Witco Chemical Co.

November Consumption Declined

Consumption of natural and synthetic rubber in the United States amounted to 91,071 long tons in November, a decline of 11.5% from the near-record 102,954 tons consumed in October, according to the Rubber Manufacturers Association. The November figure brought the 11-month total to 1,022,717, insuring that the yearly total for 1947 would surpass 1,100,000 tons, compared with the record of 1,039,296 tons set in 1946. The November total was composed of 52,014 tons of natural rubber, 30,635 tons of GR-S, 5,147 tons of butyl rubber, 2,907 tons of neoprene, and 368 tons of nitrile rubber.

Raise Original Equipment Tires

An increase in the price of original equipment tires sold to automobile and other vehicle manufacturers, amounting to approximately 5%, has been put into effect by tire manufacturers. The increase is reported to vary as to sizes and types of tires and does not represent an across-the-board jump, but on a "weighted average" amounted to the 5%. Confirmation of the increase was made by officials of Goodyear and Goodrich, but it was believed general throughout the industry.

Wolf Joins Columbia Chemical

Ralph F. Wolf

Ralph F. Wolf, technical director of the Harwick Standard Chemical Co. for the past two years, has left that organization and has joined the Columbia Chemical Division of the Pittsburgh Plate Glass Co. He will work on the development and application of rubber pigments and resin plasticizers at the division's Barberton, Ohio, laboratories. Mr. Wolf has previously been associated with the Polson Rubber Co. and the Standard Oil Development Co. During the war he was affiliated with the Rubber Division of the War Production Board and, subsequently, with the Office of the Rubber Director.

Harry Goldman Suffers Fire

The building occupied by Harry Goldman, distributor of foam rubber products for the U. S. Rubber Co., located at 230 West 58th St., New York City, was practically gutted by fire on January 3. The fire, which started in the Goldman plant, where foam rubber was fabricated in various shapes and sizes for a wide variety of purposes, spread to adjoining buildings, resulted in five alarms. Damage was estimated at over $500,000. Although the exact cause has not been fixed, it was believed that accumulated vapors from rubber cement may have touched off the fire. The plant had been closed for several days during the year-end holiday.

Trial Remains in New York

The defense motion for a change of venue in the government anti-trust suit against nine rubber manufacturers and the Rubber Manufacturers Association alleging price conspiracy since 1935 was denied on December 15 by Federal Judge John Bright. The defendants had requested removal of the trial to Cleveland because most of their records were located in nearby communities, principally Akron.

PROPOSE RUBBER SEED USE AS LINSEED OIL SUBSTITUTE

The use of rubber seed oil as a substitute for linseed oil in paint and varnish formulations and linoleum was suggested in a talk made in London on November 20 by Dr. L. A. Jordan, president of the British Oil and Colour Chemists Association. Great Britain is pressing its research efforts to develop a substitute for linseed oil as the result of extremely high prices now being quoted by foreign governments for the product.

According to Dr. Jordan, some 50,000 to 60,000 tons of rubber seed are being wasted on the plantations at present. From this seed, he said, it is possible to produce a segregated oil of normal fatty acid content, providing the seeds are dried at 100°C. Sun drying does not give satisfactory results. The oil obtained is similar to that derived from the soya bean, and has some advantages over such oil. Its iodine value is higher and it has a moderately high linoleic acid content which soya does not possess. Most of the rubber seed is now burned as fuel or just left to rot under the trees.

The oil pressed from the seeds thus appears to offer a ready means of alleviating the drying oil shortage, but there appears to be some uncertainty about the value of the residual oil-cake, which is reported by some as being useless as fodder and fit only for boiler fuel, and by others as a valuable feeding stuff for cattle. It is obvious that this matter can speedily be settled and equally obvious that any oil of which the cake is unsuitable for fodder must labor under a serious economic handicap, Dr. Jordan said.

The problem of obtaining the oil in a state of low acidity has still to be overcome, but recent work indicates that the solution will be found in a simple heat-treatment of the freshly gathered seeds, and it would appear that, in rubber seed oil, there is a potentially valuable empire product which could do much to ease the problem of supply in at least a few industries, he concluded.

Changes Corporate Name

The name of the National Rosin Oil & Size Co., manufacturers and distributors of naval stores, has been changed to National Rosin Oil & Products, Inc. The change was made to further indicate the wide and varied products manufactured and sold. The National concern has its headquarters in the R.K.O. Building, Rockefeller Center, New York 20, N. Y., and its main plant in Savannah, Georgia.

Increase Viscose Yarn Prices

Increases in the price of rayon viscose yarns ranging from 3 to 15 cents a pound have been announced by the Industrial Rayon Corp., Cleveland, Ohio. Although effective immediately, the increase does not apply to orders already entered for January delivery. No change in the prices of tire yarn is being made at this time, according to the company.

NAMES IN THE NEWS

FREDERICK P. COMBIER, for many years vice-president and sales manager of the Fibre Conduit Co. of Orangeburg, N. Y., has been appointed manager of branch sales of the wire and cable department of the U. S. Rubber Co.

THOMAS N. LOSER, until reecntly associated with R. E. Carroll, Inc., of Trenton, N. J., in a sales capacity, has joined the sales staff of Thompson, Weinman & Co., New York City. He is a graduate of Wesleyan University, and served for four years as a Lieutenant in the U. S. Naval Reserve.

BERT R. PRALL, formerly executive vice-president of the Dayton Rubber Co., has joined Butler Brothers, New York City, as executive assistant to the president.

C. D. DUGAN, until recently superintendent of the Lincoln, Neb., shops of the Western Electric Co., has been made works controller of the company's Hawthorne Works in Chicago.

HARRY B. SOULEN, vice-president and factory manager of the Mansfield Tire & Rubber Co., was recently re-elected as president of the Mansfield (Ohio) Chamber of Commerce.

J. PRESTON, associated with A. G. Spalding & Bros., Inc., since 1926, and factory manager of the company's plant in Australia since 1940, has been transferred to the Chicopee, Mass., plant where he will act as assistant manager of the rubber division.

R. H. GERKE, formerly development manager, U. S. Rubber Co., Providence, R. I., has been transferred to the company's general laboratories at Passaic, N. J., to work on fundamental research.

FRED L. FORD, formerly associated with the Keratol Division of the Atlas Powder Co. as director of sales, has been appointed sales manager of the Coated and Plastic Fabrics Department of Goodall Fabrics, Inc., New York City.

DR. WALLACE REED BRODE, formerly professor of chemistry at Ohio State University, has been appointed Associate Director of the National Bureau of Standards, succeeding DR. HUGH L. DRYDEN, who was recently appointed Director of Aeronautical Research of the National Advisory Committee for Aeronautics.

V. R. CHILDRESS, formerly associated with the B. F. Goodrich Chemical Co. in the Geon Polyvinyl Sales Department, has been appointed manager of Industrial Plastic Sales of the O'Sullivan Rubber Corp., Winchester, Va.

New Goodrich Appointments

Several appointments in the recently created Plastic Materials Sales division of the B. F. Goodrich Co. have been announced by L. H. Chenoweth, division general manager. E. L. Byan has been named manager of sales for coated fabric, calendered sheet, coated wire products and Playponds. Mr. Byan is a graduate of the Armour Institute of Technology, and has been with the company since 1934. William M. Gaston has been named manager of distributor's sales. He joined the organization in 1926, was credit manager in the St. Louis District before entering the armed forces. R. L. Hill has been appointed manager of sales for molded and extruded products. Mr. Hill has been with the company since 1945 and is a graduate of Kent (Ohio) State University. N. P. Singleton has been appointed manager of sales for cast and calendered film, coated paper and packaging material. Mr. Singleton, a graduate of the New Bedford, Mass., Textile School, has been with the organization since 1939.

DR. LINUS C. PAULING, chairman of the division of chemistry and chemical engineering at the California Institute of Technology, has been elected president of the American Chemical Society for 1949.

L. E. CHEYNEY, of the Battelle Memorial Institute, Columbus, Ohio, has been elected president of the Society of Plastic Engineers, Inc.

PAUL F. CORBIN, former Chief of the Coated Fabrics Division, Chemical Bureau, War Production Board, has been appointed vice-president of Blackburn Products, Inc., Newark, N. J.

J. J. NEWMAN, vice-president of the B. F. Goodrich Co., has been elected Chairman of the National Inter-Industry Highway Safety Committee.

G. A. COWAN, associated with the Eagle-Picher Sales Co. since 1933, except for 2½ years of duty as a captain in the Army Air Corps, has been named sales manager of the new Celatom Products Department. He will make his headquarters at Cincinnati, Ohio.

RICHARD O. ZERBE, who first joined the Monsanto Chemical Co. in 1936 as an assistant research chemist, and who has been acting as a patent attorney for the company since 1940, has been appointed director of the newly-created development department at Nitro, W. Va.

R. L. MILLER, resident attorney and assistant secretary of the Goodyear Aircraft Corp. since 1941, and associated with the Goodyear organization since 1928, has been named assistant patent counsel of the parent organization.

Zuiderhoek Succeeds Herbert

Philip H. Zuiderhoek

Philip H. Zuiderhoek has been named factory manager of the Tuscaloosa, Alabama, plant of the B. F. Goodrich Co., succeeding Joseph C. Herbert, who has been assigned other duties with the company. Mr. Zuiderhoek has been with the company since 1929, when he started as an employee in the Akron factory. He was appointed to his first supervisory position in 1936 at the Oaks, Penna., plant and has been production superintendent at the Miami, Oklahoma, plant since 1945.

Plans $500,000 Chemical Plant

The Wheatland Tube Co., Wheatland, Penna., has announced that it is spending $500,000 on a new chemical plant, in Wheatland. The plant is expected to provide an answer to the stream polution problem by turning waste materials into valuable chemicals. Edward F. Maneely, president, said that the Maneely Chemical Co. has been organized as a Wheatland affiliate to operate the plant. It will manufacture zinc sulphate, zinc chloride, zinc ammonium chloride and pigment-grade iron oxide from waste now dumped into a creek. Mr. Maneely said that research work has been going on for five years on recovery of by-products from the company's galvanizing operations. The new plant will employ about 35 men.

Aluminum-Plastic Cable Sheath

The Bell System has developed a new aluminum and plastic telephone cable sheath that it says will help accelerate its construction program. The new cable sheath uses a thin sheet of aluminum covered with a polyethylene compound. Cables covered with the new material will supplement the famiilar lead-covered cable now at peak production. The Western Electric Co., manufacturing branch of the Bell System, has begun production of the new type of cable. It will be used within local exchange areas, on pole lines and in underground conduits.

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New Hycar Elastomeric Material

Hycar P.A. (polyacrylic ester), a new elastomeric material which resembles natural, pale crepe rubber in appearance, has been introduced by the B. F. Goodrich Chemical Co., Cleveland, Ohio. The new rubber can be compounded and vulcanized in a wide range of soft to hard compositions.

The vulcanized forms are reported to exhibit outstanding resistance to heat, oils, ultraviolet light, ozone and gas diffusion, with the non-rigid forms showing extremely good flexing life. Compounding, molding, extruding, calendering and curing operations are accomplished with standard rubber equipment.

Patents covering special processes of vulcanization for Hycar P.A. have been issued to Goodrich and will be made available to licensees. These processes are said to make possible the manufacture of rubber products that will withstand operating temperatures considerably above those of conventional rubbers.

When tested under an electric iron at 400° F. for 8 hours, the new material is said to have showed no apparent loss in properties, whereas older type rubber compounds were completely deteriorated in a much shorter time. After 720 hours at 300° F., the polyacrylic ester showed a change in elongation of only 35% in comparison with 75% in 7 hours for good rubber compounds.

Ozone resistance is said to be even more striking, 600 hours exposure showing less effect on Hycar P.A. than 6 seconds exposure on rubber.

Form Witco Hydrocarbon Corp.

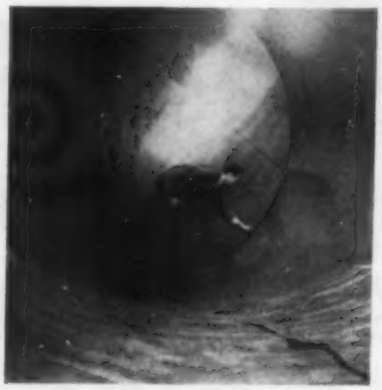
With the aim of securing additional production of channel type carbon black, the Witco Hydrocarbon Corporation has been organized to process 15,000,000 cubic feet of natural gas per day from the Barnhart pool in Reagan County, Texas. Two plants are to be constructed, one to produce approximately 2,000 barrels of gasoline, butane and propane per day, and the other to make channel carbon black which will be marketed by the Witco Chemical Co. The plants will cost approximately $3,500,000, and completion of the facilities is scheduled for July of this year. It is contemplated that future developments will include the processing of the hydrocarbons into various industrial chemicals. The site on which the facilities will be erected has been designated as Witco, Texas. Robert I. Wishnick, president of the Witco Chemical Co., heads the new corporation, which will operate the two plants, and C. E. McKinney is vice-president in charge of operations.

Reduce Price of SA 62-O

Sharples Chemicals Inc., Philadelphia 9, Penna., has announced a reduction of price from $1.25 to $1.00 a pound on SA 62-O (tetraethylthiuram disulfide). The reduction was said to have been based on the activity of this ultra accelerator compared with others on the market. The new price became effective on January 2, 1948.

Tank Lining Installation

For the past year or so, Victor H. Vodra, formerly west coast representative of the R. T. Vanderbilt Co., has headed the Northwest Research and Development Co., Henry Building, Portland 4, Oregon. The company offers a consulting service in



connection with the manufacture and installation of pipe and tank linings, as well as the production and application of protective coatings, and adhesives and cements of all kinds. One of the company's recent installations was in connection with storage tanks erected in Seattle by Reichhold Chemicals, Inc. As will be noted by the accompanying photographs, installation

was accomplished while snow almost a foot deep was on the ground. The tanks are being used for storing formaldehyde, and the linings consist of a nitrile rubber-resorcinal-formaldehyde base with a nitrile rubber-vinyl covering. All of the manholes and outlets were natural rubber covered. These were the first tanks installed at Seattle by Reichhold, which now has over 10 of them lined up in a row. The accompanying photographs are reproduced by permission of Reichhold Chemicals, Inc.

CCDA to Hold March Meeting

The Commercial Chemical Development Association will hold its Annual Meeting in New York City at the Roosevelt Hotel, March 9 and 10, 1948. The business meeting will be held on March 9, and a series of papers will be offered on March 10. Financial aspects of chemical development will be discussed at the morning meeting on March 10, while the afternoon session will be devoted to gearing commercial chemical development to sales, research and manufacturing. A social hour and dinner will follow at which time management's appraisal of commercial chemical development will be given.

Sheller Acquires Dryden Rubber

The Sheller Manufacturing Corporation, manufacturer of automobile wheels and tractors, with headquarters at Portland, Indiana, announced on December 23 that it has acquired, through Shields & Co., all of the outstanding capital stock of the Dryden Rubber Co. for a consideration consisting of $4,000,000 in cash and $1,700,000 of newly-authorized 5% preferred stock.

Dryden Rubber, which was organized in Chicago in 1901 by George B. Dryden, and is one of the foremost manufacturers of molded goods in the country, with plants in Chicago and Springfield, Ill., and Keokuk, Iowa, will be operated in the future as the Dryden Rubber Division of the Sheller Manufacturing Corp. No changes in personnel are contemplated, except that, with the expansion of the Sheller board of directors to seven members, Mr. Dryden has been elected a director and chairman of the executive committee. Oliver Vinnedge, former vice-president and general manager of Dryden Rubber, will continue to perform his regular duties.

To assist in financing the acquisition of Dryden Rubber, the Sheller concern increased its long-term indebtedness by $2,500,000 and paid $1,000,000 of the cash portion of the purchase price out of funds on hand. In connection with the transaction, Sheller also issued 65,700 additional shares of common stock, placed privately with investors by Shields & Co.

Firestone "Super-Balloon" Tire

A new tire, featuring a new tread and shoulder design, and which has a larger footprint on the road, has been introduced by the Firestone Tire & Rubber Co., Akron, Ohio. Said to insure a softer ride, the tire contains more air at a lower pressure. All sizes of the Super-Balloon tire on new cars have a 15-inch rim diameter. This has enabled some manufacturers to lower the center of gravity of their new automobiles, giving motorists easy steering cars with improved road-hugging characteristics. A comparison of the conventional 6.00-16 tire with the Super-Balloon, which will be marked 6.70-15 to conform to the smaller rim diameter and the wider cross section, shows the Super-Balloon air cushion volume to be 115 cubic inches greater. This increased volume is carried at a pressure of 24 pounds instead of 28, to further guarantee a softer ride.

Add to Geon 200 Series

Three new members of the Geon 200 series have recently been made available by B. F. Goodrich Chemical Co. This 200 series, made up of modified polymers of vinyl chloride, has included to date Geon Resins 202 and 203, which have been standard items of production for several years. Now Geon Resins 204 and 205 are in commercial production, with Geon Resin 200X14 available in experimental quantities. These new materials are said to offer increased thermoplasticity and lowering of softening point plus greater solubility.

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The pair illustrated are 28" x 42" cracker rolls—among the largest ever made—for use in the reclamation of giant airplane and tractor tires.

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FINANCIAL NEWS

FIRESTONE PROFIT DECLINES AS SALES HIT RECORD HIGH

Firestone Tire & Rubber Co. has reported a net profit of $26,977,877 for the fiscal year ended October 31, 1947, which compares with $27,082,878 reported for the previous fiscal year. The 1947 net, which was deduced after provision of $13,879,822 for depreciation and $60,815,988 for taxes, was equal to $13.45 per share of common stock, as against $13.21 in the 1946 period. Total sales for 1947, however, reached $638,447,166, an increase of 10% over the $577,833,422 in the previous year, the previous record for a peace-time year.

The consolidated balance sheet as of October 31, 1947, showed total current assets of $225,500,073, including $25,007,666 in cash, $77,467,141 in accounts and notes receivable, and $123,025,265 in inventory. This compared with total current liabilities of $79,914,787, including $25,527,853 in accounts payable, $32,996,643 in accrued taxes, $2,511,280 in foreign bank loans, $3,287,433 in acceptances payable for crude rubber shipments, and $15,591,577 in other payables and accrued items. These figures compare with $200,914,656 in current assets and $56,937,104 in current liabilities at the end of the 1946 fiscal year.

A report accompanying the statement indicated that the company's international business again showed a substantial increase. Firestone factories in England, Canada, South Africa, India, Brazil, Argentina, Switzerland and Spain operated at full capacity. Due to shortages of dollar exchange in some countries, dividends received from foreign subsidiaries were $3,796,795 less than the total profits of foreign subsidiaries included in earnings.

The report also indicated that the Firestone rubber plantations in Liberia produced more than 46,000,000 pounds of natural rubber, much of which was shipped in the form of latex. Total expenditure for improvements of and additions to plants and equipment in the company's 19 domestic and 12 foreign plants amounted to $24,400,000 during the fiscal year.

Norwalk Tire & Rubber Co.

Year Ended Sept. 30: Net profit of $201,574, which is equal to 99 cents a common share, and which compares with $469,827 for the previous fiscal year. Net sales amounted to $9,913,258, or 4.9% less than the $10,426,518 volume of the year before.

Dayton Rubber Company

Year Ended Oct. 31: Net profit of $1,800,000, which is equal to $3.80 a common share and compares with $2,101,524, or $4.43 a share, for the previous year. Net sales were approximately $34,000,000, as compared with $32,624,567 in 1946.

Stockholders Approve Plan

Preferred stockholders of the Goodyear Tire & Rubber Co. on December 15 approved the company's new $100,000,000 financing program designed to provide additional capital for its expanded post-war business. P. W. Litchfield, board chairman, said following the shareholder's meeting that the company will proceed immediately with its plan to refund $36,000,000 of first mortgage bonds now held by insurance companies and to borrow $64,000,000 more from some of the same companies. The new money will be used, he said, for new product facilities and general improvements, for increasing working capital and for strengthening the financial structure of Goodyear generally. Upon completion of the financing, Goodyear will have outstanding $31,579,000 of 3½% notes due 1964, and $68,421,000 of 3% notes due 1967. The company's first mortgage will be cancelled and the first $100,000,000 of debt will be in the form of unsecured promisory notes. Goodyear has no current bank debt.

A. G. Spalding & Bros., Inc.

Year Ended Oct. 31: Net profit of $2,178,902, which is equal to $4.18 a share, after all charges, and which compares with $1,469,935, or $2.82 a share for the preceding fiscal year. Sales in the fiscal year increased to $24,242,499 from the $19,480,017 for the fiscal year ended Oct. 31, 1946. Net current assets on Oct. 31, 1947, amounted to $9,112,203 against $8,519,905 a year earlier. Inventories, at lower of standard cost or market, totaled $7,549,687, compared with $3,789,523 last year.

Armstrong Rubber Co.

Year Ended Sept. 30: Net profit of $2,033,646, which is equal to $5.24 a common share, on net sales of $34,266,408. Because of the inclusion of a wholly-owned subsidiary, the Lake Shore Tire and Rubber Co., no exact comparison with the previous fiscal year is available. Excluding the subsidiary, the net profit for the year ended Sept. 30, 1946, was $1,141,690, or $2.79 a common share, on net sales of $17,092,043.

DuPont Leases Ilmenite Lands

E. I. du Pont de Nemours & Co. has announced the signing of a long-term lease of ilmenite-bearing lands with the State of Florida. Ilmenite is the black ore from which white titanium pigments are manufactured. DuPont maintains plants for such purpose in Baltimore, Md., and Edgemoor, Delaware. The lease provides the company with a large domestic supply of the ore and thus ends its dependence on foreign sources. The lands leased, owned by the state, are in the north central part of Florida.

TWO NEW TYPES OF SYNTHETIC ARE INTRODUCED BY PHILLIPS

Announcement of pilot plant production of two new types of synthetic rubber was made by the Phillips Petroleum Co. on December 28. They are Philprene A, said to be superior for tire treads to natural rubber as well as to commercial synthetics currently available, and Philprene B, which shows promise as a replacement for natural rubber in tire carcasses. Both are butadiene-styrene copolymers, manufactured in water emulsions at temperatures considerably lower than those used in making other types of synthetic rubber.

According to the company, tire and mechanical goods manufacturers who have been supplied with experimental quantities of Philprene A have reported that it gives superior wear and better resistance to cracking than natural rubber or GR-S. Experimental tires with treads made from Philprene A have been tested on company cars and are said to have shown exceptional wearing qualities.

Philprene B is also said to have some application in tire treads, but its principal application is expected to be in carcasses. Chief advantages claimed for this synthetic rubber include high tensile strength, improved resistance to cracking, and low heat build-up. Estimated plant production costs of Philprene A are said to be approximately that of regular GR-S, but Philprene B costs are expected to be slightly higher.

The Phillips announcement also indicated that in its latex form, Philprene synthetic rubber will make a satisfactory replacement for natural rubber latex.

Brazil Reveals Export Plans

Brazil plans to release a considerable quantity of high grade rubber and latex for sale abroad in the near future, according to the Brazilian Government Trade Bureau. The offers, expected to amount to approximately 25% of total annual production, will be timed with the expected decline in the use of synthetic rubber by rubber manufacturers in the United States after present government controls expire. It has also been revealed that Brazil has set aside 3% of all Federal tax revenue for development of the Amazon Valley, the main rubber-growing area. Much of Brazil's rubber is currently being produced on the former Ford plantations, which are now owned by the government and which are in full operation.

Approve Share Increase

Holders of capital stock of the Anaconda Wire and Cable Co., New York, on December 23 approved a proposal to increase the authorized no par capital stock of the company from 1,000,000 to 2,000,000 shares. Of the authorized shares, 422,470 are issued and holders of record as of December 23 will receive an additional certificate for one share for each share held. The company is a subsidiary of the Anaconda Copper Co., which at the end of 1946 owned 70% of its outstanding stock.

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LOS ANGELES NEWS

The newly-elected chairman, directors and committeemen for 1948 met at the Mayfair Hotel in Los Angeles, to discuss and plan the year's program of the Los Angeles Rubber Group.

Chairman Phil Drew (Goodyear) addressed the approximately forty members present and outlined the 1948 program of the Group. Proposed activities for the year were discussed and assigned to the various committees. After the general meeting, each committee withdrew to formulate their plans.

Judging from the ambitious program set for 1948, the Los Angeles Rubber Group is well on its way towards becoming the voice of the Southern California Rubber Industry.

New Year's day was an especially happy one for Frank E. Titus (Goodrich). In recognition of his forty years of service with the B. F. Goodrich Co., Mr. Titus was called back to Akron, Ohio, where he was presented with a forty-year diamond-studded service pin by John L. Collyer, Goodrich president.

As a resident, civic leader and rubber executive in the Los Angeles Area for the past twenty years, Mr. Titus received the congratulations of his friends in and out of the industry.

With the approach of winter and hazardous driving conditions, motorists were urged to give a thought to their tires and were offered a few hints on safe winter driving by D. W. Walsh, Pacific Coast Tire Sales Manager of the United States Rubber Company.

"The possibility of skidding under slippery conditions is considerably heightened during the winter," Mr. Walsh said. "Consequently, it behooves the motorist to see that his tires have plenty of tread on them for maximum traction and skid resistance."

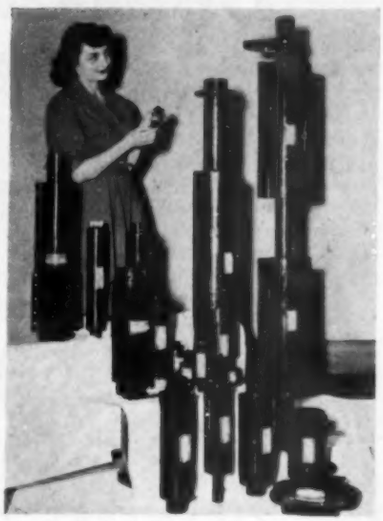
Proper inflation is another important consideration, he said, pointing out that over-inflation results in a lesser area of tire contact with the road and thus increases skidding tendencies of the car. Furthermore, over-inflation also lessens carcass resistance leading to possible tire failure from icy or rutted roads.

Under-inflation increases the tendency to rim bruise causing the tire to pinch between the rim and curb or other objects. This is true at all times, he said, regardless of temperature, but emphasized that under-inflation and cold weather together placed an added strain on the inner tube. Obviously, he stated, that while weather conditions could not be controlled, proper tire inflation can be maintained.

Reduced speed, especially on turns, is an important factor in skidding, Mr. Walsh said. He advocated smooth, even brake application and steady acceleration to enable the car to maintain its grip on the road.

Avery Adhesives, manufacturers of pressure sensitive labels and adhesives, has awarded a contract for the construction of a new factory building in Monrovia, Calif. The structure will contain 17,800 square feet of floor space and is expected to cost aproximately $80,000.

Torsilastic Rubber Springs



Some of the Torsilastic rubber springs in production or under development by the B. F. Goodrich Co. are shown in the accompanying illustration. The Torsilastic rubber spring consists of two cylinders, or a shaft and cylinder with the space between them filled with rubber permanently bonded to the metal. Weight of the vehicle or suspended object can be connected either to the outer cylinder or the inner cylinder or shaft. One metal part is held in fixed position while the other is free to turn under applied weight and all springing is accomplished by the twisting movement of the rubber.

Thermoid Opens Nephi Plant

The new molded goods plant of the Thermoid Company of Trenton, N. J., at Nephi, Utah, has been officially opened. The plant will eventually manufacture a complete line of conveyor belts, radiator hose, fan belts, and other types of industrial rubber goods. When it hits full stride it will employ approximately 300 workers, with a pay roll of some $100,000 a month.

Takes Over Colonial Beacon

Standard Oil Co. of New Jersey, which owns nearly all the outstanding stock of the Colonial Beacon Oil Co., has announced that it is taking over the business and assets of that company. The transfer will not affect the marketing of refined petroleum products in Colonial Beacon's New York and New England territory.

Cable Plant Contract Awarded

The Wigton-Abbott Corp. of Plainfield, N. J., has been awarded a contract for a one-story addition to the cable manufacturing plant of the Triangle Conduit and Cable Corp. on Jersey Avenue, in New Brunswick, N. J. The new structure, on a plot 200 by 325 feet, will provide 65,000 square feet of additional production space and boiler and powerhouse facilities.

Two New Buffalo Reclaims

Two new Buffalo reclaims, designated 2017 and 1018 ,are now in production by the U. S. Rubber Reclaiming Co., Inc., 500 Fifth Ave., New York 18, N. Y. These grades are blends of synthetic and natural rubbers, and hence will provide a stable and unlimited source of supply, according to the company. Both grades are easily workable, with good milling, calendering and tubing properties. They mold easily, leaving clean surfaces. Cured physicals are excellent.

Form Eastern Carbide Corp.

Formation of the Eastern Carbide Corp., a new company that will enable manufacturers to obtain all their carbide needs from one source, has been announced. The new company offers a complete line of carbide items including not only the base metal but also finished tools and dies. The firm, located at 909 Main St., New Rochelle, N. Y., is prepared to furnish complete carbide tooling for the plastics industry.

Martin Changes Division Name

The Glenn L. Martin Co., Baltimore, Maryland, has changed the name of its Plastics and Chemicals Division to that of the Chemicals Division. It was pointed out that inclusion of the word "plastics" in the name of the division had led to the erroneous impression that the division will process or fabricate materials. On the contrary, it will sell raw materials for processing and fabricating, including Marvinol, a vinyl resin.

Carbon Black Tax Upheld

Regardless of the manufacturing process used, the Texas occupation tax must be collected on carbon black, according to a recent ruling by the Texas Attorney-General. State Comptroller George H. Sheppard had inquired whether new methods using crude oil or refinery residue, as well as natural gas, were subject to taxation. The levy ranges from 4.1% to 5.2% of market value, depending upon the yield of carbon.

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AQUAZINC is particularly convenient for surface application of Zinc Stearate. When diluted with 8 to 20 parts of water, it can be applied by spray or bath.

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CANADIAN NEWS

Meetings of Kitchener rubber union locals will be called in the near future to discuss a recommendation that Canada's 14,000 rubber workers conduct a wage drive for minimum increases of 22 cents an hour in 1948 contracts.

The recommendation comes from District 6 Council of the United States Rubber Workers of America (C.I.O.-C.C.L.). Carl Fitzgerald, president of the council, said that the proposal embodies two aims: A minimum wage boost of 22 cents and proposed general adoption of a 40-hour week in the rubber industry.

Announcing the executive policy, Joseph Mackenzie, Canadian director of the U.R.W.A. and executive secretary of the council, said the union's research committee had indicated the new aims were necessary in the face of increased living costs.

He stated the cost-of-living index had risen from 134.8 on July 1st, when the union won its last increase, to approximately 145 as of November 1st. He added that there were indications that a level of 150 would be reached by January 1st.

Regarding the 40-hour week, the rubber union executive said it had long been the objective of the Canadian rubber workers. He referred to a slackening of production pressure, and place of the 40-hours week in helping to maintain full employment.

Mr. Mackenzie added that record production and profits of the Canadian rubber companies in 1947 combined to make this the ideal time for adoption of a 40-hour week. He said substantial wage raises would be required to maintain take-home pay when shift to the 40-hour week is made.

Recent action of directors of Seiberling Rubber Co. of Canada, Ltd., in declaring an extra dividend of 50 cents a share along with the usual payment of 25 cents suggests that 1947 will be by far the best in the company's history. The latest dividends—a total of 75 cents a share—are payable February 16th, 1948, to stockholders of record February 6, and call for a total disbursement of $37,500 on the 50,000 shares presently outstanding.

Earlier last year it was announced that production was higher than at any time in history, and with no stoppages of work and materials generally in better supply it is reasonable to assume that this record rate of output has continued.

A labor strike in 1946 necessitated the suspension of operations for several weeks but despite this prolonged work stoppage the sales volume for the year substantially exceeded that for any prewar year and included several months of volume greater than for any month prior to 1946. Net earnings for the year 1946 of $80,804, or $1.61 a share, were the best on record.

Dunlop Tire and Rubber Co. Ltd., of Toronto, will erect a new factory in Whitby, Ontario, with the initial plant costing $1,500,000.

Construction will start early in 1948 on a 55-acre tract acquired by the company, one-quarter of a mile from the new four-lane highway. The purchase price has not been disclosed, and the location and identity of the company had been kept secret by town authorities until recently.

The move is in line with the company's policy to secure adequate space for future industrial expansion, as the present location of its Toronto plant does not provide sufficient space for future development, according to the statement released here.

Situated alongside an existing spur line of the CNR, the new plant will cover 100,000 square feet and will require initially at least 2,000,000 gallons of water per month to be pumped in on a special line from Lake Ontario.

Goodyear Tire & Rubber Co. of Canada declared a dividend of $4 a share on common stock for the final quarter of 1947, payable on January 2nd to shareholders of record December 16th. This brings the total declared in 1947 to $10 per share ($1 was paid for the first quarter, $1 for the second quarter, and $1 plus $3 for the third quarter), a new peak in the company's history. This compares with a total of $4 paid for 1946, $4.25 for 1945, $5 for 1944 and the previous peak of $7.50 per share established in 1938.

Carl M. Croakman has been added to the staff of Binney & Smith, Ltd., 33 Edward St., Toronto, where he will assist his father, Elmer G. Croakman, in the sale of carbon black, iron oxides, bone blacks, and various dispersed products. The younger Croakman is a graduate of the Colorado School of Mines. He worked with the Goodyear Aircraft Corp. in 1942, and served in the U. S. Army from 1943 to 1945, during which time he spent 14 months with the Manhattan Project. In 1946 and 1947 he was with the N. J. Zinc Co. as a mining engineer at Austinville, Va.

Allan Rae, who has been associated with the Canadian organization of A. Schrader's Son Division, Scovill Manufacturing Co., since 1935, and assistant Toronto branch manager for the past 10 years, has been named Toronto branch manager, succeeding S. A. Howell who is retiring after 26 years with the Canadian branch plant. Previously to joining the Schrader Canadian organization, Mr. Rae was for 13 years associated with the sales department of the Dunlop Tire and Rubber Goods Co., Ltd., in various capacities, including that of assistant to the manager of car and truck manufacturers equipment sales.

Some 700 workers at the Papineau plant of the Dominion Rubber Co., Ltd., were recently granted wage increases and extra paid holidays, according to a recent union announcement. Male workers were given an increase of 10c an hour while female workers reecived 7c more an hour. The majority of workers at the plant are men. The new contract is reported to allow for three extra paid statutory holidays per year as well as a system of paid annual vacations.

Carl M. Croakman
joins Binney & Smith, Ltd.

William J. Dyke, formerly secretary of the Polymer Corporation, has been named secretary-treasurer of that Crown-owned organization. At the same time it was announced that P. C. Browne, formerly cashier, had been named to the newly-created post of assistant to the treasurer. Ian Cameron, formerly treasurer of Polymer, has resigned from the company.

The merger of Laucks, Ltd., a wholly-owned subsidiary, into Monsanto (Canada) Ltd. has been completed. The process of assimilation of Laucks, Ltd., adhesive manufacturer with headquarters at Granville Island, Vancouver, B. C., into the parent company has been under way for more than a year. Monsanto (Canada) Ltd. acquired the capital stock of the Laucks concern early in 1946.

The Foxboro Co., Ltd., affiliated with the Foxboro Company of Foxboro, Mass., manufacturers of measurement and control instruments, recently moved into its spacious new building in the Ville LaSalle section of Montreal. The new building is said to be the largest plant in Canada devoted to the manufacture and sale of industrial instruments.

Lloyd J. Falkenhagen, general manager of the Joseph Stokes Rubber Co., Ltd., Welland, Ontario, since 1943, and associated with that company since 1926, has been elected vice-president and general manager. It was also announced that James A. Skidmore, who came to the company in 1945 from the Welland Chemical Co., has been appointed assistant treasurer.

1901 - 1948

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A Prosperous New Year!

We wish you the fullest measure of Success in the year to come.

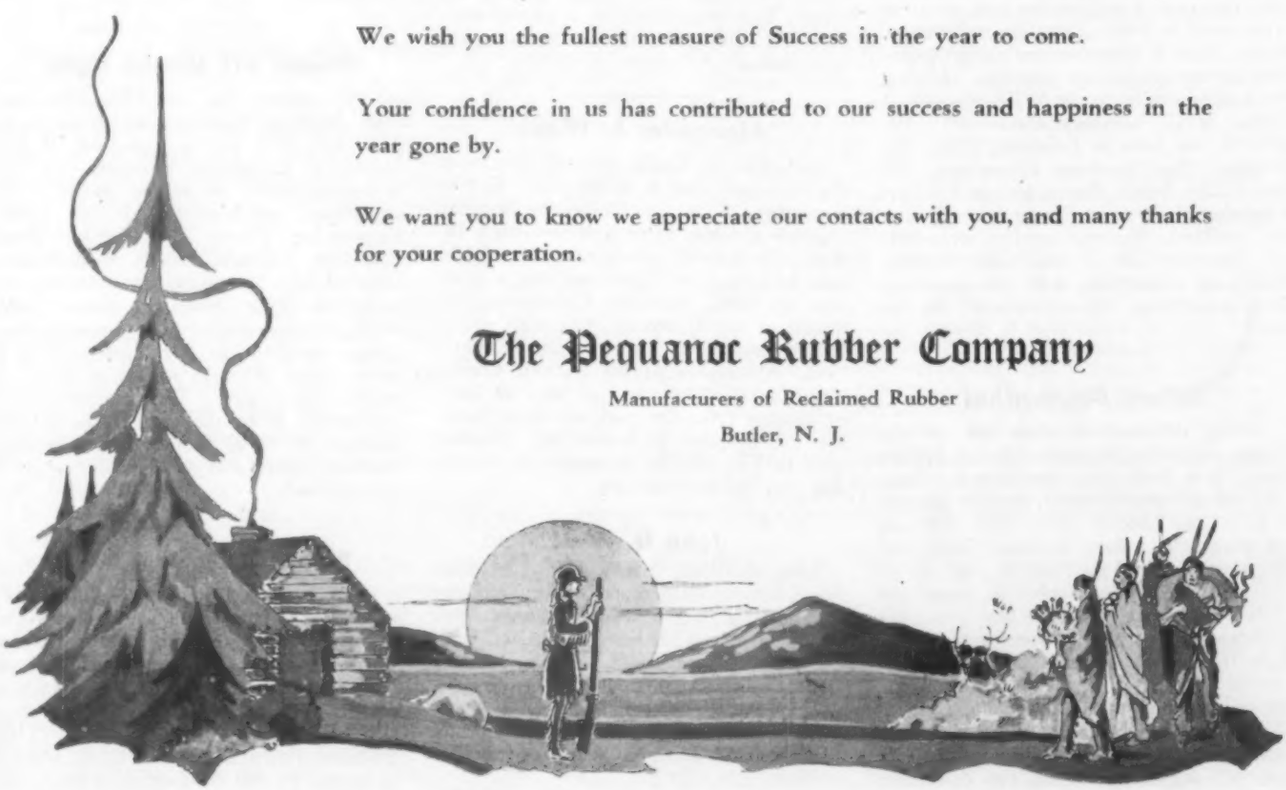
Your confidence in us has contributed to our success and happiness in the year gone by.

We want you to know we appreciate our contacts with you, and many thanks for your cooperation.

The Pequanoc Rubber Company

Manufacturers of Reclaimed Rubber

Butler, N. J.



OBITUARIES

Albert J. Kayser

Albert Julius Kayser, head of original equipment sales to manufacturers in the Shoe Products Division of the Goodyear Tire & Rubber Co., died on December 28, following a brief illness, at the Akron City Hospital. Born in Daranelle, Arkansas, December 3, 1892, Mr. Kayser was graduated from Joplin, Mo., high school and attended the University of Missouri for two years. He joined Goodyear on October 1, 1919, at Kansas City as an employee of the shoe products sales department. He was transferred to Milwaukee in May, 1931, in charge of sole and heel sales to manufacturers. In September, 1936, he was named head of all original equipment sales to manufacturers. In November, 1946, the division was expanded, under his supervision, to meet demands for increased production. Services were held on December 31 at the McGowan Funeral Home, Cuyahoga Falls, Ohio. Cremation took place at Cleveland Highland Park Crematory. A wife and daughter survive.

Herman P. Schultz

Herman P. Schultz, former sales manager of the Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, Ohio, died of a heart ailment on December 21 at h's home in Cleveland, Ohio. He was 48 years old. Mr. Schultz joined Republic in 1922, and in 1935 was appointed sales manager, a position he held until his resignation in 1946. Since his resignation, he has been a manufacturer's representative for various rubber concerns. During the war he served on the WPB mechanical rubber goods advisory committee. Mr. Schultz was born in Edinburg, Ohio, and attended Ohio Wesleyan University. He was a 32nd degree Mason, and an Elk, and a member of the First Presbyterian Church in Cleveland. Funeral services were held on December 23 at the King Funeral Home in Cleveland, with interment at Ravenna, Ohio. He is survived by his wife.

Sidney Blumenthal

Sidney Blumenthal, chairman of the board of Sidney Blumenthal & Co., 1 Park Ave., New York City, textile and rubberized fabric manufacturers, died on January 5 in his residence in New York. He was 84 years old. Born in New York, Mr. Blumenthal joined the firm, founded by his father, in 1899. A pioneer in group life insurance, he negotiated the first group life insurance policy ever written by the Aetna Life Insurance Company. Mr. Blumenthal was a member of many civic and social groups including the Advertising Club of New York, the Museum of Modern Art and the National Republican Club. He leaves a widow, a son and two daughters.

J. W. Woodcock

J. W. Woodcock, a director of the John Bull Rubber Co., Ltd., Evington Valley Mills, Leicester, England, died on January 1 at the age of 50. During the first World War, Mr. Woodcock served in the Navy, and after demobilization joined the Dunlop Rubber Co., Ltd., in Birmingham, later being transferred to Manchester as personal assistant to the Managing Director of the Mackintosh Factory. He joined the John Bull Rubber Co. in 1930, and became a director early in 1946. Mr. Woodcock was a member of the National Joint Industrial Council of the Rubber Industry. During his business career, he visited the United States on several occasions. He is survived by his wife and daughter.

Jesse M. White

Jesse M. White, president, treasurer and general manager of J. M. White, Inc., manufacturers of insulated wire and automotive specialties, of Philadelphia, Penna., died on January 9 in his home in suburban Merion, at the age of 64. Mr. White was a pioneer in the development of automotive electrical equipment, and organized the company which bears his name in 1901. Born in Live Oak, Florida, Mr. White was long a racing enthusiast. He built the "Triplex," a racing car which set a world's speed record of 207.5 miles an hour at Daytona Beach, Florida, in 1928. One year later, after one of his drivers had been killed in a racing accident, he announced his retirement from auto racing. A widow survives.

Alexander E. Webb

Alexander E. Webb, research chemist of the Firestone Tire & Rubber Co., died on December 23 at the University hospital, Columbus, Ohio, after a three-month illness. He was 35 years old. Mr. Webb was born in Ada, Ohio, and was a graduate of Ohio Northern University. He taught at the Maumee, Ohio, high school before coming to Firestone in February, 1942. A member of the Summit County Toastmasters Club, he had been on leave of absence from the company since entering the hospital in September. Services were held in Ada on December 27. A wife and two children survive.

John H. Wall

John H. Wall, inventor of a machine which automatically dipped rubber footwear in a solution to give it a shiny finish, died on January 1, at his home in Bristol, R. I. He was 77 years old. A resident of Bristol for more than half a century, he was born in Rensselaer Falls, N. Y. Mr. Wall was a former member of the Bristol town council and the board of tax assessors.

New Vinyl Flooring Material

A stain, scar and flame resistant flooring material, as resilient as rubber floor covering but longer wearing, has been introduced by the Chemical Products Division of the Goodyear Tire & Rubber Co., Akron. The new material is a calendered vinyl product, and is available in a wide range of colors and marbleized patterns. In addition to its use as a floor covering material, it is said to be ideally suited for use on kitchen drainboards, counters and desks. As a supplementary material, Goodyear has also introduced a vinyl cove base for use with the new flooring product. To simplify installation procedures for the new flooring material and to take advantage of the thermoplastic qualities of it, Goodyear has also developed an electrically-controlled flooring heater which will heat the entire lap area, assuring perfect seams.

Tire Production Still Gains

Passenger car tire production in the United States soared past the 64,000,000 unit mark in the first 10 months of 1947, more than 10,000,000 units ahead of production for the same period in 1946, according to the latest report of the Rubber Manufacturers Association. Specific figures are 64,785,501 as against 54,185,031 units. Production of bus and truck tires in the same 1947 period amounted to 14,997,073 units, as against 13,006,546 in the first 10 months of 1946. Total automotive casing production amounted to 79,782,574 units, as compared with 67,191,577 in the 1946 period. Production of passenger car tires in October, 1947, amounted to 7,364,743 units, an increase of 13.38% over the 6,495,900 produced in September.

Transfer ATF Machine Rights

The complete line of ATF Duplicate Plate Molding Machines, which has been built for ATF by George Gall of the Stereotype Equipment Company, for use in making rubber as well as plastic printing plates, has been sold to the Elmes Engineering Works of American Steel Foundries, Chicago, Illinois, to be manufactured for exclusive distribution by American Type Founders Sales Corp. ATF precision duplicate plate making machines are built in five models, with a range from 14 x 14 inches to 24 x 24 inches platen size. The machines offer production, from the original to finished plates in 25 to 40 minutes, and additional duplicate plates, in any quantity, at 15 minutes each.

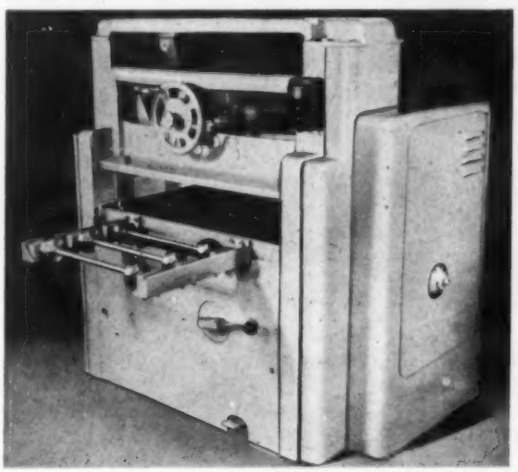
Redesignate Philback 0 Black

Since its initial introduction, Philblack O, a product of the Phillips Petroleum Co., has been designated as a "Miscellaneous Furnace" black. Since road and laboratory tests have shown the new black to possess very excellent resistance to abrasion, it has been reclassified as a "High Abrasion Furnace" (HAF) black, and will be known by that designation in the future.

NEW EQUIPMENT

Hobbs Tri-Power Cutting Press

Improvements designed to increase production efficiency are incorporated in a new die cutting press for the rubber and other industries recently introduced by the Hobbs Manufacturing Co., 26 Salisbury St., Worcester, Mass. Called the Hobbs Tri-Power Cutting Press, power is transmitted to the head of the unit from a 2 h.p. motor via a 24-inch, 470-pound flywheel, revolving



at approximately 600 r.p.m. This power is transmitted via "no give" helical cut gears, a main crankshaft of high carbon steel, and 2 connecting rods to the 1,000-pound head.

Because of its weight and rigid construction, the Hobbs die press head cannot give or twist under any normal condition. The ways in which the head travels are long and wide and heavily constructed. Head bearings are 13" long and 4" wide. Four of these on each end make a total of 416 square inches of bearing surface. A cast iron cap across the top of the press locks the head in place.

The new "Tri-Power" is readily adaptable to a wide variety of industries by virtue of a clutch and brake, which in turn allows several different types of operation . . . from jogging to continuous run or single stroke. The head may be jogged to any desired position or stopped at any point in the stroke. The brake is a thoroughly tested V-belt type and the clutch is a multiple disc dry plate design mounted in the hub of the flywheel. The clutch is compact, easily adjusted and readily available for servicing.

In the front of the press is a roller cradle with rollers mounted on needle bearings. Available in the 24" standard or 30" large size, this cradle relieves the operator of much of the physical work ordinarily required in pulling out and pushing in the board. The controls, all within easy reach, are: an electric switch on the right leg of the machine, an operation selector lever on the right hand side, a foot pedal at the lower right hand corner, and the head adjusting wheel immediately in front of the operator. The press is available in two sizes—24" x 38" and 24" x 44."

Silicone Mold Lubricant Speeds Release Improves Tires

DC SILICONES

PHOTO COURTESY THE MOHAWK RUBBER COMPANY, AKRON, OHIO

DC MOLD RELEASE EMULSION NO. 35

FOR CLEANER MOLDS

The Dow Corning Silicones used in making DC Mold Release Emulsion No. 35 are chemically related to glass and are, therefore, exceptionally heat-stable materials. The silicone surface formed over molds by spraying them with DC Mold Release Emulsion No. 35 does not break down to form carbon deposits after hundreds of hours at vulcanizing temperatures. It also prevents the adherence of mold dirt to metal surfaces. Consequently, clean molds stay clean for an incredibly long time.

FOR BETTER FINISH

Cleaner molds and more effective lubrication of mold surfaces improves quality—gives high polish to sidewalls—reduces surface blemishes to a minimum.

FOR FEWER REJECTS

DC Mold Release Emulsion No. 35 selectively wets metal surfaces and it is not easily picked up by synthetic rubbers during plastic flow. There is, therefore, less likelihood of non-knits and fold-overs.

FOR EASIER OPERATION

DC Mold Release Emulsion No. 35 is an easy to handle water emulsion applied by spraying in the usual manner with conventional equipment. It is effective in very high dilutions ranging from 1 part of the emulsion in 50 to over 150 parts of water, depending upon the equipment used. There are no objectionable odors or hazards involved in handling DC Mold Release Emulsion No. 35.

For further information, send for leaflet No. V 5-2.

DOW CORNING CORPORATION, MIDLAND, MICHIGAN

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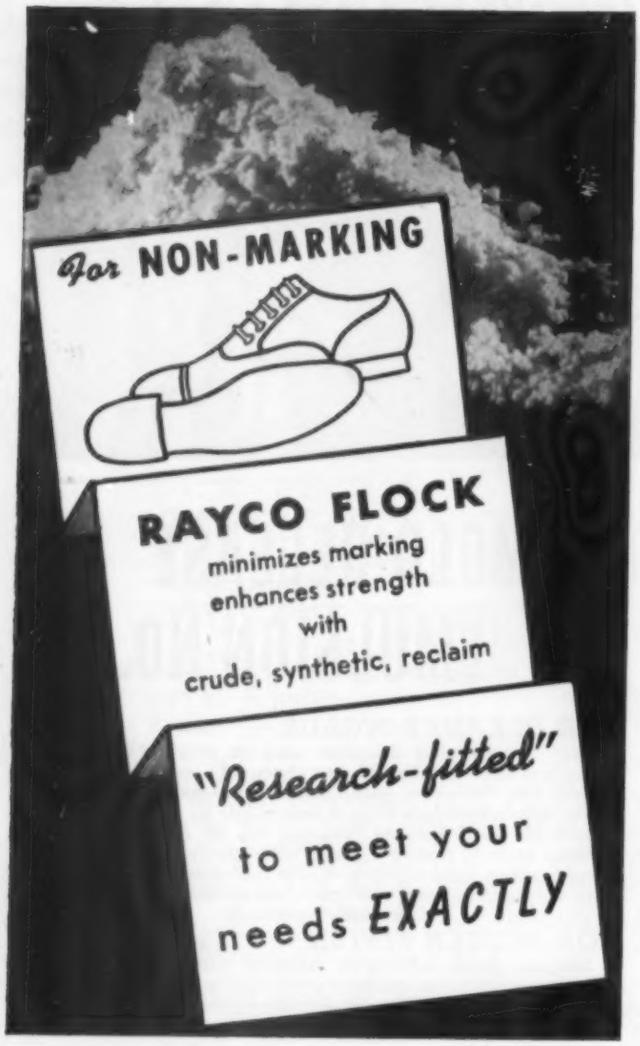
FIRST IN SILICONES

Rayco Flock



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PIONEER PRODUCERS OF
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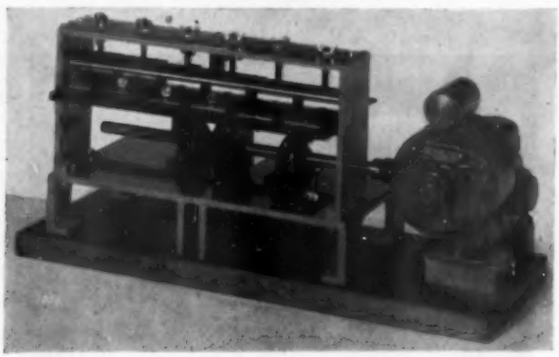
100 TREMONT ST., CENTRAL FALLS, RHODE ISLAND

Ross Rubber Flexing Machine

Two types of flexing machines, designed and approved by the Technical Committee of the Heel and Sole Division of the Rubber Manufacturers Association, for the flex testing of heels and soles, have been put into production by the Emerson Apparatus Co., 171 Tremont St., Melrose 76, Mass. The two types are known as the Ross Rubber Flexing Machines, and the so-called No. 1 machine tests up to six pair of samples all of which must be of the same thickness, while the No. 2 machine



also tests six pair of samples, but the thickness between the different pairs may vary from ⅛ of an inch up to ½ inch. The units may also be used for testing other types of rubber products.

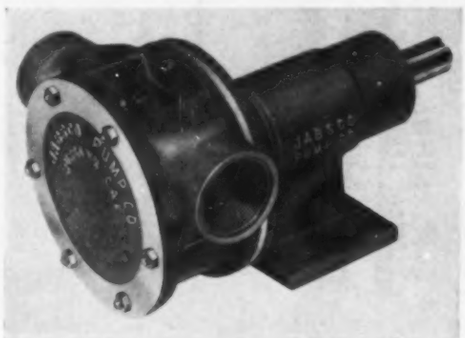
The samples to be tested on either machine should be 1 inch wide and approximately 6 inches long. They are mounted in a sample holder plate and two samples of the same material making a pair of test pieces are held in place in adjacent recesses by means of a flat plate and wing nut. The ends of the samples extend through rolls opposite the same holder plate. With the No. 1 machine, the upper roll guiding the samples can be brought in contact with the roll by changing the position of the bearing supports at the ends of the machine. The upper rolls of the No. 2 machine are adjusted in position by means of the wing nut above and below the top plate. The upper rolls of either machine should not be adjusted so as to bring pressure on the samples, since they are intended to act as guides for the samples only.

In operation, the samples should be punctured with a No. 6 chisel point round awl, the puncture to be such that it is parallel with the width of the sample and is at right angles to the longitudinal center line at a point 2 15/32 inches from one end. The awl should be lubricated with soap before the puncture is made. The samples should then be attached to the testing unit so that the end 2 15/32 inches from the puncture is fully in the recess holding the samples on the sample holder plate. In this way, the puncture is at the center point of the arc of flexure. The sample holder plate should be parallel with the floor level when the sample is attached. The adjustable top roll is let down to rest on the samples while in this position, and then the wing nuts are tightened firmly.

To interpret results, cut growth should be measured at regular intervals to the nearest .05 inch. The sample has a rating of 1 (the awl gives a .1 inch cut) to start with. At a rating of 5, the crack is ½ inch wide, and at a rating of 10, failure has been reached regardless of the depth of the crack.

Jabsco Stainless Steel Pump

A new stainless steel pump intended primarily for use in rubber and chemical applications (18-8 Mo., Type 317) has been developed by the Jabsco Pump Co., 2031 North Lincoln St., Burbank, Calif. Like previous Jabsco models it is extremely simple in construction, having but one moving part—a tough, flexible impeller made of



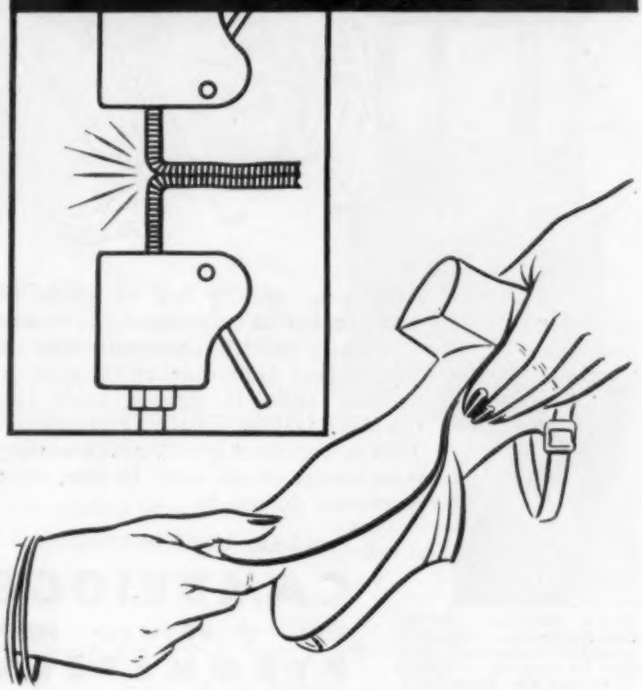
a neoprene compound selected for its chemical inertness as well as toughness and wear resistance. The natural resilience of the impeller results in automatic compensation for wear in the pump body, and facilitates passage of suspended solids without jamming.

The pump primes automatically, operating suction being in excess of 27 inches of mercury. The self-priming feature is of particular interest for portable units and for intermittent transfer of active chemical solutions, since it obviates any need to locate the pumps in sumps where they will be immersed in the liquid to be pumped or to provide auxiliary facilities for manual priming. The liquid pumped provides automatic lubrication between the pump body and the impeller. The pump can be operated in either direction and mounted in any position without any change in efficiency. Positive action mechanical seal is provided. Bearings are factory lubricated and sealed and are adquately protected by ample drain holes and slinger ring. An unusually wide range of satisfactory operating speeds, from 100 to 1750 r.p.m. offers a maximum of flexibility in driving arrangements.

FOR HIGH ABRASION FURNACE USE PHILBLACK O

FOR FURTHER DETAILS, SEE AD ON PAGE 364

TESTED IS TRUSTED



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ADHESION STRENGTH?

* Scott Tester Model L tests rubber in dumbbell tube or strip form up to 500 lbs. tensile, for tear, adhesion and tensile strength. World-standard tests; "Picturized" graph results.

"Adequate Testing Always Pays"

* Registered Trade Mark

SCOTT TESTERS, INC.

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Standard of the World

And it is equally bad to guess at calender roll temperature, for in calendering is where scorching of rubber usually occurs. Determination of the surface temperature of still or moving rolls is simple with the CAMBRIDGE Roll Pyrometer. This accurate, rugged, quick-acting instrument is so easy to use, that workmen do use it.

ROLL MODEL. Needle-type for checking within-the-mass temperature and mold-type for reaching into mold cavities also available.

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PYROMETERS

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Fig. 17. Welded steam-jacketed, staybolt-less, horizontal vulcanizer with quick-opening door. All sizes; various working pressures. Low maintenance.

***BIGGS* Vulcanizers are Standard Equipment in the Rubber Industry**

Biggs-built vulcanizers and devulcanizers have always had a prominent place in the development of the rubber industry. For over 47 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers. Biggs modern all-welded units with quick-opening doors are available in all sizes and for various working pressures—with many special features.

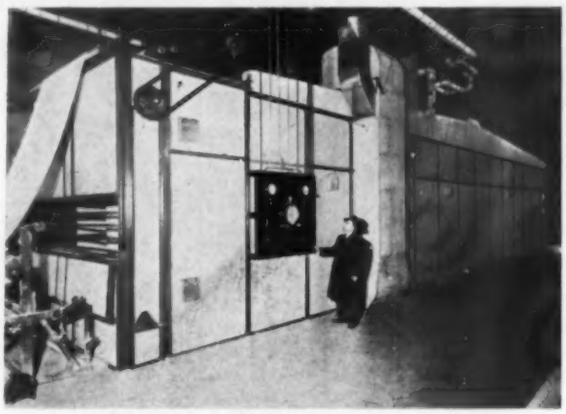
Ask for our Bulletin No. 45-A

THE *Biggs* BOILER WORKS CO.

1007-A BANK ST. • AKRON 5, OHIO, U. S. A.

New Festoon Curing Oven

Industrial Ventilation Co., 249 Fifth St., Cambridge, Mass., recently installed a festoon curing oven in a rubber plant which is reported to be saving 2½ hours on every curing cycle compared to previous types of installations. The curing unit is 72 feet long by 20 feet high by



9 feet wide, and can be utilized in the vulcanization of either one 60-inch roll of goods or two 40-inch rolls. Capable of reaching 270°F. in 45 minutes from room temperature, using 120 pounds steam pressure, the unit is equipped with a 12,000 c.f.m. recirculating blower and a 2,500 c.f.m. purging blower. The conveyor is driven by a 5 h.p. motor. Sprinklers are installed inside the unit for fire protection. All circulating ducts are insulated to prevent loss of heat.

Upward-Acting Hot Plate Press

The 50-ton upward-acting hot plate press illustrated herewith has been especially designed and built for laboratory or small production pressure processing, where heat is required by the Hydraulic Press Manufacturing

Co., Mount Gilead, Ohio. A convenient hand lever controls the self-contained hydraulic power unit. Adaptable to either steam or electrical heating, the machine has two 20 by 20 by 1½ inch hot plates for handling laminating or curing work.

LABORATORY Mills & Presses

The EEMCO Laboratory Mill is entirely enclosed, ready to operate. It is equipped with built-in motor, control and variable speed drive. Mechanism readily accessible.

The 12" x 12" EEMCO 42-ton Laboratory Press is furnished with self-contained hand pumping unit, air operated fast closing, steam or electric platens, adjustable opening from 6" to 18".

Both Mill and Press are designed for research, development and small scale production.

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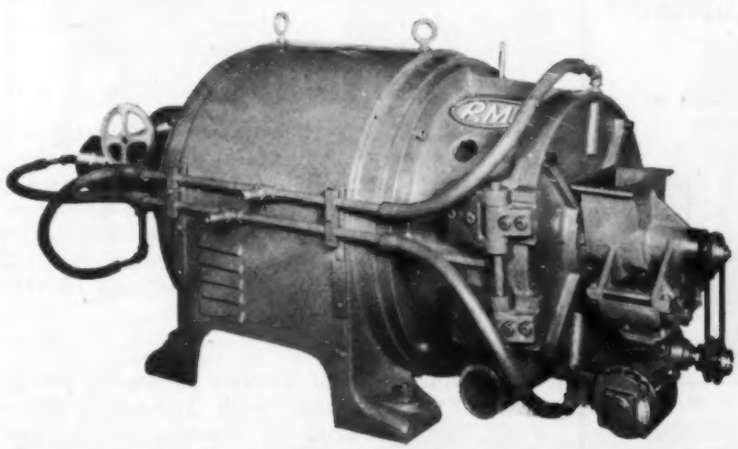
A New Heavy Duty **(TYPE X)**

P. M. RUBBER GRINDER

Developed to meet the need for a more rugged Scrap Rubber Grinder with increased capacity



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Features of Type X Grinder

- Available in Direct or Belt Drive.
- Belt Drive with standard 50 HP motor.
- Direct Drive with heavy duty shaft, powered by special 50 HP motor; no gears, no pulleys.
- Operation entirely automatic.
- Low operating cost.
- Feeding device can be regulated.
- Power gauge enables operation at full motor power without overloading.
- Water cooled to permit continuous operation without overheating.
- Finished product removed by blower insuring dustless operation.
- Fineness of ground rubber easily adjusted by simple turn of wheel.
- Capacity 400 to 800 lbs. per hour.

This new design incorporates every improvement suggested by years of specialized experience in building scrap rubber grinding machinery exclusively

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- All types of Rubber Machinery and Plant Equipment for every requirement of Large and Small Factories.
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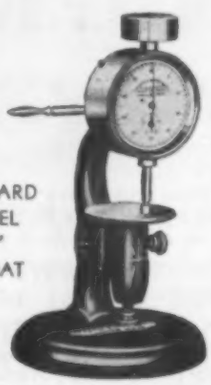


STANDARD MODEL 1¾" THROAT

THROAT DEPTHS 1¾" to 26"
FOOT TENSIONS supplied by Internal Spring or Direct Weights
FOOT DIAMETERS ⅛" to 1¼"
ROLLS Table and Roll or two Rolls
RANGE ½" or 1", also 1 CM Metric

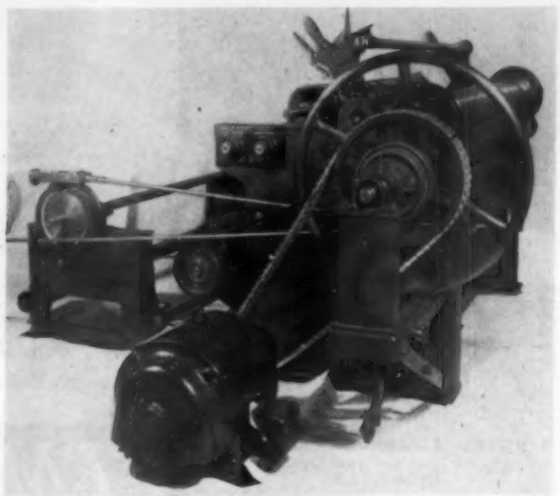
26" DEEP THROAT MODEL

SEND FOR CIRCULARS to Dept. A.

FRANK E. RANDALL CO.
248 Ash St., Waltham 54, Mass., U.S.A.

Gilraph Slitter and Rewinder

A new slitter and rewinder recently built for a leading friction tape manufacturer is reported to incorporate a number of new features which make it a high-speed, trouble-free machine. Built by the Gilraph Machine Engineering Corp., 506 Washington St., Norwood, Mass., the unit features welded steel construction, with sealed



anti-friction bearings on all shafts. The anvil rolls are mounted on a soft steel core and are easily removable for grinding. New type knife holders, equipped with sealed ball bearings, are individually removable and adjustable. The machine is supplied with vacuum edge control and can slit up to 60 inch material as narrow as ½ inch wide. It is equipped with either single or double rewind arbors.

Automatic Transportation Co., Chicago 20, Ill., has developed the **Hyskid Transporter,** a new materials handling unit which makes it possible to handle skid platforms of all heights with a single all-purpose motorized hand truck without blocks. It features a vertical hydraulic lift which raises the platform a net lift of 13 inches, from 6 inches above the floor in low position to 19 inches in raised position.

For determining the physical properties of plastics in tension, compression and flexure over the specification range of temperature of —70° to +170° F., a new **temperature-controlled cabinet** has been developed by the Baldwin Locomotive Works, Philadelphia 42, Penna., for use on standard Baldwin-Tate-Emery testing machines of 60,000 and 120,000 pound capacity.

Announcement of **Titeflex Inconel Tubing,** a new flexible tubing made with Inconel innercore and braid, has been made by Titeflex, Inc., Newark, N. J. The new hose may be supplied for temperatures up to 1700°. The innercore of the tubing is supplied with wall thicknesses of 0.005 to 0.015 inches. It has been designed to especially resist failure caused by excessive vibration.

RUGGED-DEPENDABLE-ADAPTABLE

ROYLE PRODUCTS

Continuous Extruding Machines
for the Rubber, Plastic and Chemical Industries

Continuous Vulcanizing Machines
for Rubber Insulated Wire

Plastic Insulated Wire Machines

Light Wire and Cable Capstans

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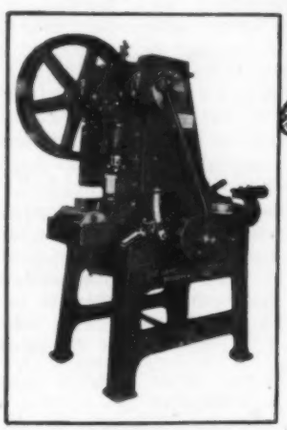
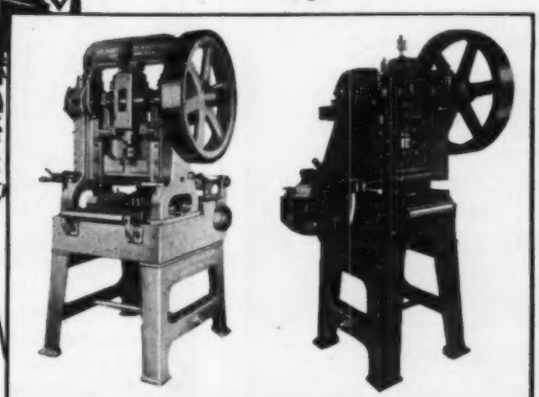
NEW Proven features for continuous volumetric control and stripping for HEELS-SOLES-TAPS and other molded products.



MODEL A-1



MODEL A-2 MODEL A-3

Here is the *Rubber Cutting Machine* that will *cut with* or across the stock grain, either singular or in multiples—from a strip of stock direct from the warming mill.

WRITE FOR FULL PARTICULARS

Production Machines
Since 1896

- Model A-1 For HEELS at high speed production, or short runs.
- Model A-2 For Multiple HEELS, HALF and FULL SOLES with stock grain.
- Model A-2S (Not Illustrated) For cutting crosswise of grain of stock.
- Model A-3 For Multiple HEELS and TAPS with or across stock grain.

The James COULTER Machine Co.

BRIDGEPORT • CONNECTICUT • U.S.A.

better than soap

here's a non-foaming

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REVIEWS

BOOKS

Plastics Theory and Practice: The Technology of High Polymers. By C. C. Winding and R. L. Hasche. Published by the McGraw-Hill Book Co., 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 280 pp. $3.50.

Issued as part of the "Chemical Engineering Series," this book was written with one specific objective in mind—that of "up-grading" the chemist and chemical engineer in the broad field of high polymers. To accomplish this broad presentation, the authors have taken many liberties with technical definitions. Viscose and rubber, for example, are presented as resins. Since those interested in the background of the field should have a general knowledge of the technology of all high polymers, much can be said in favor of simplifying the approach to the subject used by the authors.

The book is divided into seven sections, as follows: (1) Formation and Structure of High Polymers; (2) General Application of Resins; (3) Resins Formed from High Molecular Weight Natural Products; (4) Resins Formed by Condensation Reactions; (5) Polyethenic Resins; (6) Silicones; (7) Rubber and Synthetic Rubbers. The latter section is quite comprehensive and covers GR-S, the nitrile rubbers, isobutiene-diolefin copolymers, polychloroprene, and the polysulfide rubbers. The historical development of the synthetic rubbers is also traced. The appendix also includes a table showing the relative properties of both natural and synthetic rubbers. A subject index is included.

•

The Chemistry and Technology of Waxes. By A. H. Warth. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 520 pp. $10.00.

Although the literature on waxes is abundant, it is widely scattered. This book, therefore, may be considered as the first authoritative one on the subject of waxes alone, and provides a ready reference work for chemists and industrialists requiring a knowledge of the subject. Waxes of all kinds and descriptions are covered in the book and adequate space has been devoted to a special survey of the petroleum waxes, new varieties of which have recently appeared on the market. Brief reference is made to the use of waxes in rubber, both as compounding ingredients and as surface finishing agents for sunproofing. The relatively new art of dispersing rubber in wax resulting in films of considerable tensile strength is discussed, and descriptions of Pliowax, a combination of Pliolite resin and paraffin, and Sealz waxes, in which rubber is incorporated in hydrocarbon waxes of high melting point, are included.

•

A Toddler's Guide to the Rubber Industry. By D. Lowe. Published by De Montfort Press., Leicester, England. 5 x 7½ in. 68 pp. 9s. (approximately $2.00).

Composed entirely of a series of articles which appeared in the "India-Rubber Journal" from November, 1946, to February, 1947, the whimsical chapters in this book trace the activities of "Alice" in "Rubberland." During her travels "Alice" is introduced to the rubber industry, is conducted through various departments of the rubber factory, and meets such wonderful personalities as the chief buyer, chief chemist, sales manager, chief engineer, cost accountant, and finally the managing director. Written with tongue-in-cheek, this delightful satire should bring many a chuckle to the reader familiar with the operation of the modern rubber plant.

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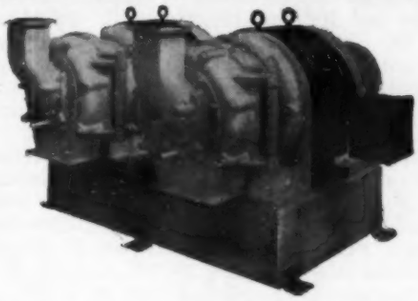

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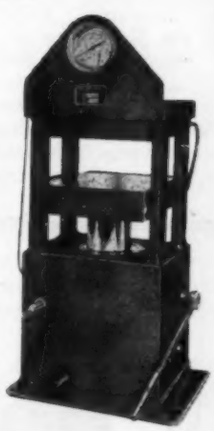

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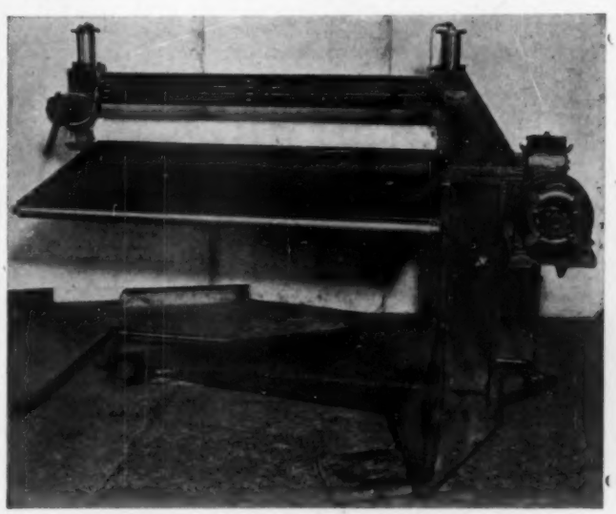

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Symposium on Rubber Testing. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 112 pp. $2.00.

The eight extensive technical papers and introduction comprising this symposium were presented at the 1947 Annual Meeting of The American Society for Testing Materials. The symposium was sponsored by A.S.T.M. Committee D-11 on Rubber and Rubber-Like Materials, the objective being to cover the work that had been done with regard to the physical and chemical methods of test, both on synthetic and natural rubbers, making available to industry the accomplishments of Government and industry during the period of war when secrecy had to be maintained.

Topics covered include the following: Significance of Voluntary Standards and Their Status in the Rubber Industry (Arthur W. Carpenter); Functions of Rubber Reserve, Past, Present and Projected (W. R. Hucks); Chemical Analysis of Synthetic Rubber (Willard P. Tyler, T. Higuchi); Methods of Stress-Strain Testing (J. W. Schade, F. L. Roch); Test for Evaluating Processibility (R. H. Taylor, J. H. Fielding, M. Mooney); Standardization of Testing and Inspection in Government Rubber Plants (R. D. Stiehler, R. W. Hackett); Testing and Grading of Wild and Plantation Rubbers (N. Bekkedahl); and Statistical Methods in Rubber Evaluation (Marian M. Sandomire).

•

The Fundamentals of Rubber Technology. Published by Dyestuffs Division, Imperial Chemical Industries, Ltd., Hexagon House, Blackley, Manchester, England. 7¼ x 9¾ in. 174 pp.

In this book are reproduced the eight lectures given during the 1946-47 session to the rubber technology students of the Newton Heath Technical School in Manchester, England, by members of the staff of the Rubber Laboratories of Imperial Chemical Industries, Ltd. In these lectures an attempt was made to expound and demonstrate an attitude of mind rather than to merely describe rubber operations, "an attempt which each author translated into fact. Titles of the lectures, and their authors, follow: The Student and Rubber Research (W. J. S. Naunton); Principles of Latex Technology (C. F. Flint); Coloring of Rubber and Rubber-Like Plastics (J. Haworth); Designing of Technical Rubber Compounds (B. J. Habgood); Fundamentals of Tire Technology (J. T. Watts); Fundamental Principles of Rubber Cable Technology (H. C. Harrison); Fundamentals of the Technology of the Rubber Proofing Industry (D. A. Harper); Physical Testing and Specifications (J. M. Buist). In a sense, this booklet represents the most modern textbook available on the subject of compounding and processing rubber.

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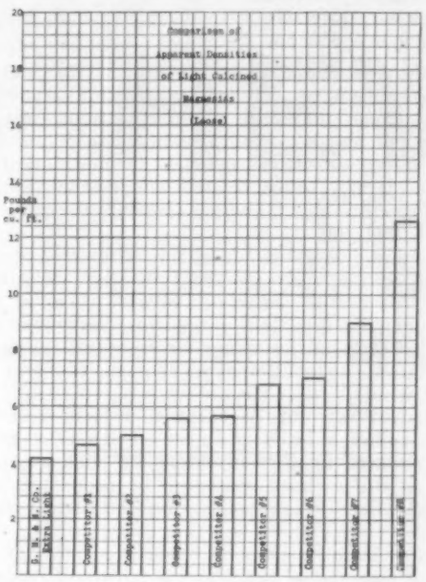
FOR FURTHER DETAILS, SEE AD ON PAGE 364

HOW LIGHT IS YOUR "LIGHT" MAGNESIA OXIDE?



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Standards on Textile Materials. Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 530 pp. $4.00.

The 1947 edition of the compilation of A.S.T.M. Standards on Textile Materials, With Related Information, gives in the latest approved form the some 85 specifications, tests, tolerances, definitions and terms on a wide range of textile materials. This 530-page book includes in addition to the standards, considerable other related information, and data on A.S.T.M. Committee D-13, which sponsors the publication each year.

The first section relates to general methods and specifications covering such subjects as the following: definition of terms relating to textile materials; identification of fibers; fastness to light; fire-retardant properties; resistance to insects; etc. The sections following cover asbestos; bast and leaf fibers; cotton (about 100 pages); glass textiles; rayon and silk; and wool.

Several proposed methods are detailed that have not been approved, but comments and criticism are invited. Some of these are accelerated aging, estimating the clean wool content in wool in the grease, evaluation of properties related to the hand, specification and test for fire-retardant properties of treated felt.

The book also includes data on basic properties of fibers, a yarn number conversion table, and a table for relative humidity. In the section involving papers, there are two contributions which cover, "A Stress-Strain Tester for Textiles Employing a Magnetic Strain Gage" by J. W. Ballou, and the other "Measurement and Elimination of Inertia Effects in Textile Testing Equipment by Means of Electric Strain Gages" by Herbert F. Schiefer

•

Liberia: 1847-1947. By Charles Morrow Wilson. Published by William Sloane Associates, Inc., 119 West 57th St., New York 19, N. Y. 5½ x 8¼ in. 226 pp. $3.75.

Liberia is the only republic in Africa and one of the two negro republics in the present day-world, the other being Haiti. Little known, because it is small and remote, and because it is poor, the Liberian Republic has nevertheless just celebrated its 100th anniversary. The full story of the birth, growth and development of the country is told in this book.

The commercial development of Liberia is closely allied with rubber, and a good portion of the text is concerned with the decision of the Firestone interests to cultivate rubber in the country and the success achieved to date. Why Liberia was chosen by the late Harvey S. Firestone, the early trials and tribulations of the company in organizing a huge rubber cultivation tract, and the steady progress of such cultivation to the point where the country now supplies some 15% of the world's supply of natural rubber is told simply and clearly. By October, 1946, the labor force employed by the Firestone plantations totaled some 30,000.

In addition to its specific interest to all those concerned with rubber, the book also stands on its own merits as an absorbing record of living democracy in severe trial. Liberia's form of government, as the author indicates, is an experiment certain to be studied by new countries formed during the dissolution of empires. The author, incidentally, will be remembered for his recent book on "Trees and Test Tubes: The Story of Rubber."

•

Extensometers. (Bulletin 263) Baldwin Locomotive Works, Philadelphia 42, Penna. 8½ x 11 in. 12 pp.

All of Baldwin's indicating extensometers and accessories are discussed in this booklet. The principal instruments described are the H. F. Moore type for tension and compression measurements, sheet metal extensometer, averaging extensometer, wire extensometer and deflectometer. Specifications for the different extensometers are included.

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Modern Packaging Encyclopedia: 1948. Published by the Packaging Catalog Corp., 122 East 42nd St., New York 17, N. Y. 8½ x 11 in. 1206 pp. $6.50, U. S.; $9.00, Canada; $11.00, foreign.

Containing some 670 pages of editorial material, 452 advertisers and a buyer's guide of 90 pages, the latest edition of this packaging encyclopedia brings the packaging data up to date, with more than 60% of the data being completely new. This latest edition, like its predecessors, covers the complete gamut of packaging papers, materials reproduction methods, as well as adhesives and plastics in packaging. New information is included on cartons and boxes, and for the first time a pictorial review of 45 set-up boxes now being used in various fields is incorporated. The buyer's guide is particularly helpful to industry.

•

Chemical Engineering Catalog: 1947-48. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 8½ x 11 in. 1584 pp.

Bigger and better than ever before, the latest edition of "The Process Industries' Catalog," the thirty-second annual edition, has made its appearance. Divided as usual into sections covering equipment and supplies and chemicals and materials, each section leads off with a classified index and is followed by manufacturers' catalogs. A trade name index and a section devoted to technical and scientific books again appears, both revised and brought completely up-to-date. The value of this catalog to the process industries is already firmly established.

•

Durez Resins in the Rubber Industry. Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y. 8½ x 11 in. 4 pp.

Application of Durez phenolic resins in the compounding of rubber stocks and in the preparation of solvent-type adhesives is discussed in this bulletin. Recommendations are made covering the various resins available for use with the intrude rubbers, GR-S, neoprene, and natural rubber. Some attention is paid to the preparation of special adhesives suitable for rubber-to-metal bonds, as well as for those used in the pretreatment of rayon and nylon fabric used for the reinforcement of rubber products. The company offers instruction sheets for specific applications of the resins.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JAN. 15, 1948

Natural Rubber

The price of spot rubber on the Commodity Exchange has moved in the relatively narrow range of 163 points since our last report (December 16), rising from the low of 21.37 on the first day of the new period (December 17) to a high of 23.00 on January 2, the first trading day of the new year. The average price of spot rubber for the month of December was 21.45 cents, based on 22 trading days.

Prices advanced slowly but steadily in mid-December and early January, encouraged by reports of decreasing stocks in Malaya, active Continental buying in the Far East, and a fair domestic consumer demand. Uncertainty over possible Washington developments, combined with reports of an acceptance by the Indonesian Republic of truce proposals offered by the Netherlands Government, resulted in lower prices in the past few days, but a stabilized market for the next few months is predicted.

According to reports from Singapore, rubber exports from the Malayan Union for November, 1947, dropped sharply to 64,435 long tons. Of this amount, 39,007 long tons were shipped to foreign ports, and 25,428 long tons went to Singapore. Stocks on hand as of November 30 were reported to be 80,275 long tons. According to the U. S. Department of Commerce, total shipments of rubber from the Netherlands Indies for the first nine months of 1947 amounted to 214,000 long tons, the greater portion of which went directly to Malaya.

Today's quotations in the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.22¼
April-June	.21
July-September	.20¼
Thin Latex Crepe:	
Spot	.29½
April-June	.28
Thin Brown Crepe, No. 2	.17⅝
Ambers, No. 3	.17⅝
Flat Bark Crepe	.14½

London Market

(Standard Smoked Sheets)

February	22.34 - 22.55
April-June	21.62 - 21.83

Singapore Market

(Standard Smoked Sheets)

February	20.09 - 20.20

Synthetic Rubber

(Dry Types)

Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50 N4NS	.400 - .470
Chemigum N3	.450 - .520
Hycar OR-25	.400 - .425
Hycar OR-15	.470 - .495
Hycar OS-10	.400 - .425
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .320
Neoprene Type NC	—— - .250
Perbunan 18	.390 - .415
Perbunan 26	.400 - .425
Perbunan 35	.470 - .495
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

The demand for scrap rubber, which was dormant for the greater part of 1947, continues to show signs of improvement, but it is yet too early to state that a revival of the market is imminent. However, a few fairly substantial orders from reclaimers are reported, and additional orders are said to be in the offing, particularly for mixed passenger and mixed beadless tire grades. Some demand for buffings is also reported. Prices shown below are those which were in effect several months ago:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$18.00
Beadless truck tires	ton	24.00
Mixed truck tires	ton	18.00
Beadless passenger tires	ton	24.00
No. 1 passenger peelings	ton	50.00
No. 1 truck peelings	ton	50.00
No. 2 passenger tubes	lb.	.07½
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06½
Mixed passenger tubes	lb.	.06¾
No. 2 truck tubes	lb.	.07¼
Red truck tubes	lb.	.07
Black truck tubes	lb.	.07
Buffings	ton	18.00

Reclaimed Rubber

Demand for reclaimed rubber continues to tax the production facilities of the industry and gives no sign of slackening in the near future. According to the Rubber Manufacturers Association, consumption of reclaim for the first eleven months of 1947 amounted to 263,100 long tons, an increase of 4.48% over the 251,813 long tons consumed in the corresponding 1946 period. There have been no changes in the price structure since our last report. Current quotations follow:

Tires				
Black, Acid	lb.	.08¾	@	.09¼
Black, Digester	lb.	.08	@	.08½
Peels	lb.	.09	@	.09½
GR-S Whole Tire	lb.	.08½	@	.09
Inner Tubes				
Black	lb.	.12¾	@	.13¼
Red	lb.	.13½	@	.14
GR-S	lb.	.09½	@	.10
Butyl	lb.	.08½	@	.09
Shoe				
Unwashed	lb.	.08¼	@	.08¾

Cotton Tire Fabrics

Although current demand for cotton tire fabrics is still high, few tire manufacturers are contracting for second quarter deliveries, despite the fact that prices are still rising. The price of chafers, for example, has been increased an additional 2 cents a pound since our last report, now being approximately 6 cents a pound higher than the prices in effect last October. Rising costs in wages and raw cotton are basically responsible for these higher prices. Current quotations follow:

Standard, Peeler, 12/4/2	lb.	.7600
Standard, Peeler, 14/4/2	lb.	.7800
Standard, Peeler, 16/4/3	lb.	.8050
Extra Staple, Peeler, 12/4/2	lb.	.8575
Extra Staple, Peeler, 14/4/2	lb.	.8775
Extra Staple, Peeler, 16/4/3	lb.	.9025

Chafers

14.4 oz. (per sq. yard)	lb.	.7750
9.25 oz. (per sq. yard)	lb.	.7325
11.65 oz. (per sq. yard)	lb.	.7050
8.9 oz. (per sq. yard)	lb.	.7475

Cotton

The price of middling uplands on the Cotton Exchange has swung in the very narrow range of 107 points since our last report (December 16), high for the period being 37.05 on December 30 and low 35.98 on January 6. The average price of middling uplands for the month of December, 1947, was 36.74 cents, based on 26 trading days. This compares with the average of 34.50 for the month of November.

As indicated by the narrow price range for the period, the cotton markets are passing through a quiet period pending legislative developments in Washington and clarification on world consumption of cotton during the current year. For the most part, the export situation looks good for the immediate future, with England expected to take 40,000 to 50,000 bales and France seeking 50,000 to 100,000 bales. Germany has already purchased 20,000 bales, and is expected to purchase additional substantial quantities.

As for the legislative situation, it is believed that the Senate Agricultural Committee will present a new farm bill to the Senate shortly. The changes in farm legislation are expected to be slight, especially in an election year. President Truman's recent budget message to Congress urged new legislation to modernize the cotton parity formula, changing the base period from the 1900-14 period to the last 10 years, with farm labor costs included. These changes, if made, are not expected to make much change in the prospective loan rates on cotton.

Quotations for middling uplands on the Exchange follow:

	Dec. 16	January 15		
	Close	High	Low	Close
March	36.11	35.75	35.56	35.67
July	34.57	34.64	34.48	34.55
October	31.68	31.72	31.62	31.68

Closing Rubber Prices on New York Commodity Exchange

FROM DECEMBER 17 TO JANUARY 15

Date	Spot	Mar.	May	July	Sept.	Sales
Dec.						
17	21.37	20.70	20.30	19.95	19.70	57
18	21.75	21.16	20.45	20.09	19.85	164
19	21.62	21.15	20.30	20.00	19.75	122
20	——	——	——	——	——	——
21	——	——	——	——	——	——
22	21.88	21.53	20.75	20.40	20.20	131
23	22.12	22.00	21.09	20.65	20.40	124
24	22.62	22.18	21.31	20.89	20.65	76
25	——	——	——	——	——	——
26	22.75	22.24	21.35	20.85	20.45	78
27	——	——	——	——	——	——
28	——	——	——	——	——	——
29	22.62	22.15	21.25	20.80	20.35	155
30	22.37	21.70	20.75	20.40	19.95	55
31	22.50	22.00	21.10	20.70	20.25	96
Jan.						
1	——	——	——	——	——	——
2	23.00	22.70	21.75	21.35	20.89	143
3	——	——	——	——	——	——
4	——	——	——	——	——	——
5	23.00	22.80	21.80	21.35	20.90	167
6	22.75	22.39	21.21	20.71	20.25	163
7	22.75	22.80	21.71	21.04	20.55	212
8	22.62	22.71	21.52	20.86	20.35	75
9	22.37	22.50	21.13	20.42	19.95	203
10	——	——	——	——	——	——
11	——	——	——	——	——	——
12	22.50	22.74	21.50	20.87	20.30	74
13	22.00	22.05	20.88	20.32	19.75	190
14	22.00	22.05	20.85	20.25	19.75	103
15	22.25	22.00	20.90	20.25	19.65	105

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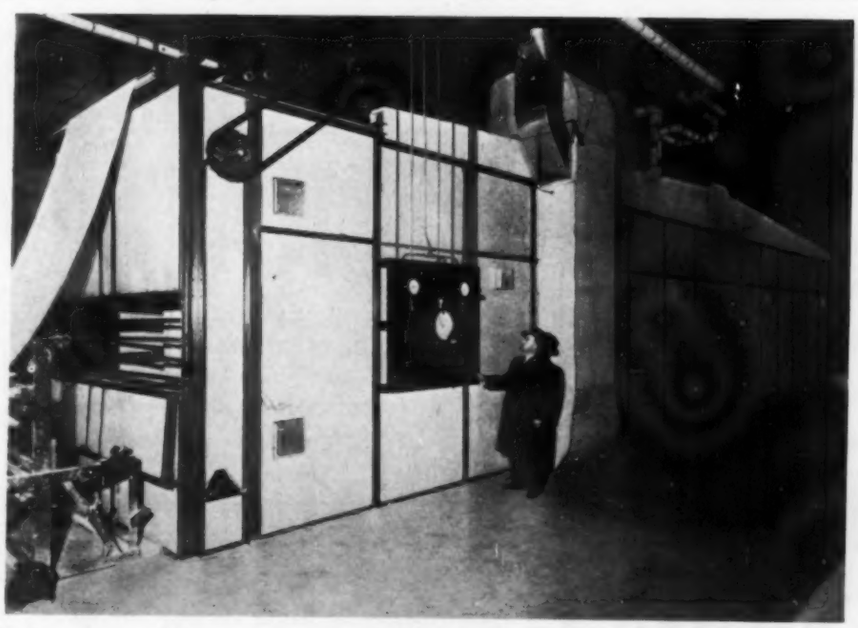

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STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS											
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,694	745,873	12.36	600,479	7,902	3,385,433	592,577
1938	397,620	125,357,730	14.07	11,878	4,147,318	15.59	2,485	623,819	11.21	411,983	5,652	1,799,124	406,331
1939	469,803	167,558,245	15.92	27,438	10,467,552	17.03	2,232	463,345	9.27	499,473	13,125	5,832,618	486,348
1940	780,820	303,117,726	17.33	33,789	14,593,466	19.28	3,634	758,007	9.31	818,243	7,060	3,197,136	811,183
1941	989,329	401,890,393	18.14	34,798	15,965,627	20.48	4,881	1,145,767	10.48	1,029,008	5,376	2,757,872	1,023,632
1942	265,980	112,377,896	18.86	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,149	10,856	5,913,386	271,293
1943	50,348	31,364,033	27.81	1,890	1,312,202	30.99	7,679	3,636,789	21.14	59,917	22,587	16,446,707	37,330
1944	103,820	73,908,389	31.78	3,091	2,092,211	30.22	6,700	3,351,233	22.33	113,611	9,739	8,712,695	103,872
1945	134,454	95,850,441	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,267	9,509	7,201,746	139,758
1946	366,415	222,552,939	27.12	8,421	5,843,085	30.98	5,344	2,859,246	23.89	380,180	7,711	5,331,954	372,469
1946:													
Jan.	18,580	13,515,971	32.48	569	371,857	29.15	446	263,279	26.33	19,595	164	41,992	19,431
Feb.	32,690	23,944,266	32.70	.....	.....	....	318	171,823	24.10	33,008	723	444,400	32,285
Mar.	31,093	22,520,391	32.33	504	328,905	29.15	160	87,344	24.34	31,757	714	488,044	31,043
Apr.	26,234	18,997,757	32.33	1,001	808,463	36.06	874	467,151	23.86	28,109	392	243,952	27,717
May	4,784	3,314,818	30.93	1,052	687,100	29.11	430	219,830	22.82	6,266	422	419,278	5,844
June	8,518	6,132,895	32.15	561	366,165	29.15	466	244,580	23.41	9,545	460	446,253	9,085
July	20,641	13,947,817	30.17	696	451,523	28.96	291	148,442	22.85	21,628	2,457	1,600,600	19,171
Aug.	34,125	18,656,966	24.41	1,231	803,435	29.14	366	193,680	23.06	35,722	1,515	902,005	34,207
Sept.	41,311	22,317,275	24.12	.....	.....	....	425	219,849	23.09	.....	145	81,481	.....
Oct.	45,523	24,745,403	24.27	672	438,938	29.15	691	377,319	24.38	46,886	649	613,424	46,237
Nov.	58,756	30,648,620	23.29	130	85,363	29.24	379	200,270	23.58	59,265	60	29,800	59,205
Dec.	44,159	23,810,760	23.87	2,005	1,501,336	33.43	494	265,679	24.02	46,658	17	20,625	46,641
1947:													
Jan.	92,459	51,035,472	24.64	.....	.....	....	315	169,081	23.65	.....	20	16,644	.....
Feb.	57,771	30,580,942	23.63	2,426	1,550,499	28.52	481	256,760	23.84	60,678	1,991	1,149,953	58,687
Mar.	35,128	19,421,550	24.46	496	324,103	29.15	463	246,573	23.76	36,087	39	23,592	36,048
Apr.	45,453	23,627,600	23.21	34	26,754	34.84	524	282,941	24.09	46,011	26	20,725	45,985
May	91,918	47,208,658	22.93	763	442,050	25.87	345	186,201	24.11	93,026	14	9,169	93,012
June	62,346	28,339,739	20.29	2,825	1,642,417	25.95	554	298,705	24.07	65,725	47	22,998	65,678
July	56,080	22,379,698	17.08	1,407	855,454	25.09	74	27,458	16.55	57,561	421	226,777	57,140
Aug.	43,637	16,127,766	16.93	1,784	960,877	24.48	104	24,768	18.54	45,525	191	118,666	45,334
Sept.	45,724	14,589,611	14.24	516	324,206	27.12	44	10,414	15.29	46,284	174	95,640	46,110
Oct.	46,898	14,819,306	13.11	3,081	1,370,242	19.85	....	.....	....	49,979	134	164,620	49,665

Source: U. S. Department of Commerce.
Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule.

Natural Rubber
(Including Latex and Guayule)
(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1946:				
Jan.	25,143	10,355	209	133,294
Feb.	35,104	10,131	290	157,977
Mar.	35,348	12,792	445	180,088
Apr.	19,847	16,914	190	182,831
May	6,126	17,867	327	170,763
June	23,382	16,466	911	176,768
July	14,942	21,998	222	169,490
Aug.	45,087	28,405	592	185,580
Sept.	46,122	31,123	988	199,591
Oct.	36,735	35,421	106	200,799
Nov.	55,231	37,323	35	218,672
Dec.	57,620	38,802	23	237,467
1947:				
Jan.	102,080	45,328	43	294,191
Feb.	30,318	40,983	1,253	283,479
Mar.	40,437	43,104	509	280,812
Apr.	55,976	43,818	0	292,970
May	32,738	43,018	0	330,960
June	57,055	42,529	311	345,175
July	57,243	40,389	421	131,624
Aug.	44,672	47,289	191	130,040
Sept.	46,241	50,557	174	122,097
Oct.	49,340	57,286	314	114,115
Nov.	50,840	52,014	449	110,824

Source: 1936-40, U. S. Department of Commerce; 1941 to date, Civilian Production Administration.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.
(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1945:						
Dec.	48	58,742	....	.....	18	9,983
1946:						
Jan.	129	121,228	....	.....	....	.....
Feb.	38	35,699	....	.....	5	2,178
Mar.	100	70,315	....	.....	....	.....
Apr.	362	261,098	....	.....	....	.....
May	325	212,899	....	.....	....	.....
June	80	80,006	....	.....	....	.....
July	219	178,564	115	91,412	7	19,839
Aug.	234	249,380	....	.....	4	13,438
Sept.	159	161,937	4	9,337	23	47,147
Oct.	282	367,393	21	29,307	305	216,901
Nov.	152	270,379	28	39,502	3	10,233
Dec.	199	287,167	57	41,757	26	52,096
1947:						
Jan.	183	252,580	37	29,087	36	71,252
Feb.	270	300,828	36	44,629	17	39,679
Mar.	137	158,530	190	112,132	21	28,898
Apr.	85	106,783	178	86,923	31	48,178
May	212	208,440	524	259,745	86	164,611
June	76	63,612	83	37,314	47	88,420
July	19	24,444	287	122,677	22	50,204
Aug.	151	159,338	143	78,357	19	46,667
Sept.	86	120,633	408	192,352	18	120,633
Oct.	210	389,245	352	187,255	35	88,776

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699*	72,920	114,963
1946:					
May	66,044	366	70,914	13,102	93,447
June	63,388	415	62,899	5,161	94,095
July	63,176	353	54,562	3,175	101,007
Aug.	64,300	634	61,486	2,175	103,076
Sept.	63,705	1,031	58,798	2,480	108,840
Oct.	62,086	1,149	60,729	474	110,913
Nov.	60,305	894	57,794	1,781	113,556
Dec.	62,648	902	53,453	1,857	114,963
1947:					
Jan.	62,103	0	58,764	3,359	115,655
Feb.	59,125	0	53,321	2,166	119,912
Mar.	57,478	0	55,514	704	121,322
Apr.	50,117	4	54,333	357	116,829
May	39,069	0	48,692	433	105,291
June	35,681	0	42,580	2,286	97,612
July	31,917	0	37,607	412	97,728
Aug.	32,901	0	39,001	585	91,288
Sept.	30,518	0	41,865	343	79,246
Oct.	33,834	0	45,668	194	67,379
Nov.	37,825	670	39,057	188	67,858

Source: Civilian Production Administration.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated. * Includes year-end adjustment of 5,384 tons to cover non-reporting companies.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1942	3,721	8,956	23	9,734	22,434
1943	182,259	33,603	1,373	14,487	231,722
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735

Consumption

1942	2,579	6,833	22	8,217	17,651
1943	131,977	26,205	304	12,405	170,891
1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699

Exports

1942	222	1,037	....	160	1,419
1943	14,937	2,540	40	631	18,148
1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	1,020	72,920

Stocks at End of Period

1942	1,050	1,786	4	1,772	4,612
1943	30,975	6,415	1,035	3,143	41,568
1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,532	114,963

Source: Civilian Production Administration.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1940	1941	1942	1943	1944	1945	1946	1947
Jan.	40,370	46,190	49,216	36,085	47,540	52,008	51,186	57,119
Feb.	37,557	42,782	42,666	36,274	47,754	48,856	47,889	50,551
Mar.	44,607	49,572	50,820	41,586	52,263	55,364	56,801	59,947
Apr.	47,683	55,879	49,554	48,177	50,005	59,024	62,045	64,140
May	52,946	60,121	53,212	49,828	54,230	60,748	66,774	70,865
June	55,459	59,062	50,077	52,325	54,266	60,580	63,221	71,329
July	53,865	63,906	54,606	49,867	55,119	66,170	69,044	73,441
Aug.	55,346	63,575	48,793	51,880	55,618	70,058	66,701	72,089
Sept.	52,297	59,768	50,093	49,707	56,318	64,529	62,216	71,384
Oct.	53,807	58,412	50,094	53,111	53,154	55,708	66,598	73,277
Nov.	49,074	54,670	50,729	50,703	54,967	53,543	61,315	.....
Dec.	46,413	53,568	39,250	48,695	52,250	49,745	61,043	.....
Total	589,424	667,505	589,110	568,238	633,482	696,333	734,833	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1946:					
Jan.	24,458	22,031	28.5	1,253	29,099
Feb.	23,187	20,702	28.0	1,368	30,216
Mar.	25,136	22,075	26.0	1,841	31,436
Apr.	23,930	22,396	25.8	1,238	31,732
May	25,322	22,162	24.9	1,338	33,554
June	24,882	21,725	27.4	1,416	35,295
July	22,619	21,350	27.9	961	35,603
Aug.	25,798	24,566	27.3	1,093	35,742
Sept.	23,956	23,715	26.4	579	35,404
Oct.	26,322	26,706	27.7	759	34,261
Nov.	24,748	24,385	25.6	1,108	33,516
Dec.	25,254	23,597	25.6	1,507	33,666
1947:					
Jan.	25,545	27,715	26.6	1,443	30,053
Feb.	23,990	25,484	27.3	1,142	27,417
Mar.	26,209	26,157	26.8	1,268	31,940
Apr.	26,696	25,066	25.5	1,073	33,527
May	25,408	21,908	23.1	1,271	37,145
June	24,144	21,283	25.0	1,200	39,598
July	21,252	20,433	26.8	1,052	39,704
Aug.	21,658	21,093	24.4	1,414	40,130
Sept.	22,561	23,801	25.6	902	38,461
Oct.	25,648	26,735	26.3	1,016	36,643
Nov.	23,145	23,425	25.7	1,339	36,347

Source: 1936-40, Department of Commerce; 1941 to date, Civilian Production Administration.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1930	2,784,745	571,241	3,355,986	1939	2,866,796	704,308	3,571,104
1931	1,973,090	416,648	2,389,738	1940	3,692,328	721,637	4,413,965
1932	1,135,491	235,187	1,370,678	1941	3,744,500	875,381	4,619,681
1933	1,573,512	346,545	1,920,057	1942	220,814	133,083	353,897
1934	2,177,919	575,192	2,753,111	1943	0	4,501	4,501
1935	3,252,244	694,690	3,946,934	1944	0	124,819	124,819
1936	3,669,528	781,862	4,451,390	1945	83,792	313,643	397,435
1937	3,915,889	892,382	4,808,271	1946	2,148,677	930,739	3,079,416
1938	2,000,985	485,852	2,486,837				
1946:							
Jan.	56,367	45,033	101,400	July	209,180	87,591	296,771
Feb.	57,784	34,914	92,698	Aug.	247,261	97,881	345,142
Mar.	85,810	37,636	123,446	Sept.	232,280	95,658	327,938
Apr.	132,631	80,762	213,393	Oct.	283,586	107,154	390,740
May	166,942	75,373	242,315	Nov.	269,081	100,892	369,973
June	141,090	60,038	201,128	Dec.	266,665	107,616	374,281
1947:							
Jan.	246,605	99,818	346,423	July	279,631	97,814	377,445
Feb.	267,015	105,042	372,057	Aug.	261,158	86,509	347,667
Mar.	301,525	118,234	419,759	Sept.	307,942	110,720	418,662
Apr.	314,765	106,984	421,749	Oct.	315,969	118,365	434,334
May	284,357	96,430	380,787	Nov.	305,148	87,611	392,759
June	307,124	91,810	398,934	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1942	1943	1944	1945	1946
Passenger Car	1,025,880	780,291	1,748,917	4,504,368	15,058,469
Truck & Bus	5,298,603	4,949,004	6,391,441	6,486,652	5,939,244
Agricultural	194,900	301,997	997,301	1,441,909	1,735,992
Earth Mover	1,814	945	703	1,308	5,520
Total	6,521,197	6,032,237	9,138,362	12,434,237	22,739,225

	1947					
	July	Aug.	Sept.	Oct.	Nov.	Dec.
Passenger Car	1,665,587	1,482,922	1,898,907	2,225,026	1,771,961	1,967,503
Truck & Bus	599,064	571,236	572,236	725,182	521,230	651,273
Agricultural	177,163	181,107	201,285	236,717	228,308	266,690
Earth Mover	1,751	775	1,436	1,730	1,210	586
Total	2,443,565	2,236,040	2,673,864	3,188,655	2,522,709	2,886,052

Source: The Tire & Rim Association, Inc.

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. . . 2000 lbs. tensile strength minimum
. . . dry, non-tacky film
. . . no adding of vulcanizing agents . . . no heat treatment necessary other than drying

PROPERTIES

1. Dried film tensile strength.....2000 lbs. per sq. in. minimum
2. Dried film ultimate elongation.....700% to 800%
3. Viscosity .....Thin
4. Specific gravity 1.025
5. pH Value .....9.8 to 10.2
6. Solids content .....53% ∓0.5

APPLICATION

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2. Coating and impregnating of fabric, paper and wadding for strength, water resistance, and base for further coating.
3. Preparation of molds utilizing properties of flexibility and freedom from further heat treatments.
4. Dipped goods where deposition of film is complete on drying.
5. Adhesive for paper, fabric and leather where bond is improved by film deposit of cured Buna S.
6. As an additive to natural latex, as well as to buna and neoprene, for extension and modification.

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1935 (total)	19,263	29,406	1,514	50,183	49,362	8,196
Passenger Car.	17,063	26,036	948	44,047	43,256	7,054
Truck and Bus	2,200	3,370	566	6,136	6,106	1,142
1936 (total)	21,446	30,866	1,073	53,385	56,041	10,717
Passenger Car.	18,941	26,999	644	46,584	49,013	9,291
Truck and Bus	2,505	3,867	429	6,801	7,028	1,426
1937 (total)	22,353	29,886	1,246	53,485	53,310	10,383
Passenger Car.	20,055	26,177	696	46,928	46,497	8,745
Truck and Bus	2,298	3,709	550	6,557	6,813	1,638
1938 (total)	11,516	30,567	1,049	43,132	40,907	8,451
Passenger Car.	10,086	27,104	580	37,770	35,789	6,937
Truck and Bus	1,430	3,463	469	5,362	5,118	1,514
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car.	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car.	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car.	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947:						
June (total)	2,130	5,094	302	7,526	7,583	6,345
Passenger Car.	1,716	4,345	146	6,207	6,102	4,834
Truck and Bus	414	749	156	1,319	1,481	1,511
July (total)	1,975	5,230	236	7,441	6,790	5,838
Passenger Car.	1,507	4,481	123	6,112	5,475	4,284
Truck and Bus	467	750	113	1,329	1,315	1,554
August (total)	1,723	5,451	276	7,520	7,165	5,464
Passenger Car.	1,414	4,638	122	6,175	5,820	3,905
Truck and Bus	379	813	154	1,346	1,345	1,560
Sept. (total)	2,128	5,828	289	8,246	7,919	5,191
Passenger Car.	1,675	4,917	133	6,725	6,496	3,706
Truck and Bus	453	911	156	1,521	1,423	1,485

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton				Rayon and Nylon [b]		
	Tire Cord Not Woven	Cord Fabric Woven	Chafer and All Other Tire Fabrics	Total	Tire Cord Not Woven	Tire Cord And Other Tire Fabrics	Total
1943:							
Jan.-Mar.	11,155	34,287	7,819	53,261	564	9,833	10,397
Apr.-June	11,625	34,684	8,549	54,858	1,253	10,185	11,438
July-Sept.	15,754	36,854	9,618	62,226	1,220	9,184	10,404
Oct.-Dec.	15,928	42,639	10,464	69,031	1,806	12,055	13,861
Total	54,462	148,464	36,450	239,376	4,843	41,257	46,100
1944:							
Jan.-Mar.	17,135	42,783	11,452	71,370	1,812	15,830	17,642
Apr.-June	17,587	40,580	11,499	69,666	1,353	19,586	20,939
July-Sept.	16,653	38,462	11,055	66,170	1,299	25,915	27,214
Oct.-Dec.	12,982	34,107	10,948	58,037	2,773	33,630	36,403
Total	64,357	155,932	44,954	265,243	7,237	94,961	102,198
1945:							
Jan.-Mar.	16,671	43,835	12,306	72,812	3,726	37,777	41,503
Apr.-June	16,044	42,383	13,604	72,031	4,064	42,476	46,540
July-Sept.	15,136	38,158	14,122	67,416	3,549	42,606	46,155
Oct.-Dec.	15,514	36,442	13,573	65,529	a	47,734	47,734
Total	63,365	160,818	53,605	277,788	11,339	170,593	181,932
1946:							
Jan.-Mar.	17,128	39,377	15,245	71,750	a	51,208	51,208
Apr.-June	19,622	40,197	18,623	78,442	a	52,511	52,511
July-Sept.	17,279	39,259	18,787	75,325	5,102	46,932	52,034
Oct.-Dec.	20,660	42,668	21,708	85,036	5,858	50,589	56,447
Total	74,689	161,501	74,363	310,553	10,960	201,240	212,200

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1936	21,514	32,188	721	54,423	57,036	10,945
1937	22,464	29,554	749	52,767	52,373	10,312
1938	11,515	28,134	644	40,293	37,848	8,166
1939	18,190	31,998	1,002	51,190	50,649	7,036
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	n.a.	n.a.	n.a.	13,958	12,568	5,742
1943	6,183	12,373	176	18,732	15,260	2,584
1944	6,461	19,739	190	26,390	26,750	2,823
1945	6,119	33,161	408	39,688	41,102	3,671
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947:						
Jan.	1,922	5,085	181	7,188	8,720	5,075
Feb.	2,129	3,988	171	6,289	7,841	6,621
Mar.	2,460	3,740	266	6,466	7,921	8,050
Apr.	1,897	3,510	324	5,731	7,093	9,480
May	1,980	3,268	323	5,571	5,752	9,772
June	2,154	3,364	260	5,779	5,440	9,252
July	1,970	4,051	196	6,216	4,542	7,909
Aug.	1,792	4,509	197	6,499	5,179	6,937
Sept.	2,119	4,930	184	7,233	6,550	6,339

Source: The Rubber Manufacturers Association, Inc.
n.a.—Not available.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1929	26⅞	15½	20.55
1911	184	114	141.30	1930	16½	7½	11.98
1912	140	108	121.60	1931	8⅜	4⅛	6.17
1913	113	59	82.04	1932	4¾	2½	3.49
1914	93	56	65.33	1933	9⅜	2¾	5.96
1915	79	58½	65.85	1934	15⅜	8⅜	12.92
1916	102	55	72.50	1935	13¾	10½	12.37
1917	90	52	72.23	1936	23	13½	16.41
1918	70	40	60.15	1937	26⅞	14	19.39
1919	57	38½	48.70	1938	17⅞	10¼	14.64
1920	56½	16	36.30	1939	24	14⅛	17.57
1921	21¾	11½	16.36	1940	24	18¾	20.10
1922	28⅜	13¾	17.50	1941	24⅞	19¼	22.40
1923	37⅛	24¾	29.45	1942	22½	22½	22.50
1924	40⅛	17⅜	26.20	1943	22½	22½	22.50
1925	121	34⅜	72.46	1944	22½	22½	22.50
1926	88½	36¾	48.50	1945	22½	22½	22.50
1927	41¾	33	37.72	1946	22½	22½	22.50
1928	41¼	17	22.48	1947	25	14	20.00

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1940	1941	1942	1943	1944	1945	1946	1947
Jan.	11.19	10.66	19.85	21.34	20.76	22.36	25.49	32.58
Feb.	11.10	10.87	20.05	21.61	21.34	22.29	26.57	33.91
Mar.	10.90	11.08	20.42	21.98	21.65	22.43	27.52	35.89
Apr.	10.89	11.48	21.10	22.02	21.71	21.88	28.40	35.89
May	10.33	12.97	20.88	21.97	21.63	23.30	28.17	36.51
June	10.72	14.66	19.78	21.92	22.31	23.42	29.89	37.83
July	10.42	16.55	20.27	21.46	22.33	23.27	34.11	38.03
Aug.	9.84	17.06	19.45	21.09	22.11	23.10	36.31	34.83
Sept.	9.69	17.94	19.62	21.10	22.10	23.25	37.59	32.21
Oct.	9.62	17.31	19.79	21.00	22.32	23.85	36.79	32.39
Nov.	9.97	17.21	20.21	20.32	22.13	24.71	31.50	34.50
Dec.	10.18	18.09	20.55	20.32	22.28	25.21	33.03	36.74
Average for Year	10.40	14.66	20.16	21.34	21.89	23.25	31.28	35.11

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins [b]	Molding and Extrusion Materials [b]	All Other [b, c]
1946	52,080	11,673	61,852	27,083
1947:				
Jan.	6,197	1,237	6,802	3,097
Feb.	5,131	892	5,345	2,255
Mar.	5,853	1,142	6,922	3,081
Apr.	5,981	1,425	6,890	2,021
May	4,431	1,432	5,777	1,486
June	3,915	1,084	4,937	1,611
July	3,722	1,537	4,567	1,747
Aug.	4,105	1,650	4,826	2,336
Sept.	5,790	1,194	5,788	2,354
Oct.	5,965	1,781	7,671	2,623
Nov.	7,246	1,680	5,637	2,279
Dec.	....	....	....	....

Source: Bureau of the Census.

Notes: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting; (b) Resin content; (c) Includes Adhesives, but excludes data for protective coating resins.

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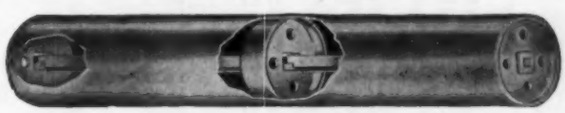

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Rubber Industry Employment, Payrolls, Wages and Hours

Employment — Thousands of Production Workers and Index (1939 = 100)

Month	1946 All Rubber Products Number	1946 All Rubber Products Index	1946 Rubber Tires & Tubes Number	1946 Rubber Tires & Tubes Index	1947 All Rubber Products Number	1947 All Rubber Products Index	1947 Rubber Tires & Tubes Number	1947 Rubber Tires & Tubes Index
Jan.	209	172.7	99	182.4	240	198.8	110	235.5
Feb.	214	177.1	101	187.3	240	198.2	109	233.3
Mar.	220	181.5	104	191.6	238	196.5	108	231.4
Apr.	217	179.1	104	192.8	234	193.5	106	227.0
May	217	179.7	105	193.4	223	184.5	102	220.0
June	221	182.9	106	195.8	219	180.7	118	217.0
July	214	177.0	99	183.1	212	175.2	115	212.3
Aug.	223	184.0	103	189.9	216	178.2	118	216.6
Sept.	229	189.1	107	197.0	216	178.5	113	209.1
Oct.	236	194.8	110	204.0	219	181.4	...	....
Nov.	240	198.8	112	207.0	...	....	...	....
Dec.	242	200.1	112	206.3	...	....	...	....

Payrolls — Production Workers Pay Rolls Unadjusted Index (1939 = 100)

Month	1945 All Rubber Products	1945 Rubber Tires & Tubes	1946 All Rubber Products	1946 Rubber Tires & Tubes	1947 All Rubber Products	1947 Rubber Tires & Tubes
Jan.	323.2	342.4	290.1	272.6	386.3	416.3
Feb.	323.6	339.8	292.1	271.9	385.0	413.3
Mar.	315.4	301.9	298.2	281.1	374.3	397.3
Apr.	315.9	306.0	319.7	312.9	383.9	414.2
May	299.8	288.6	322.1	314.2	367.2	399.3
June	304.3	293.8	331.4	318.3	361.9	396.1
July	298.7	286.8	321.4	304.3	352.7	393.8
Aug.	231.3	211.4	336.9	311.2	357.0	397.0
Sept.	231.3	211.4	363.9	348.9	368.6	398.9
Oct.	254.2	239.8	361.3	346.1	....	....
Nov.	257.8	240.2	377.4	360.3	....	....
Dec.	275.5	256.7	392.2	368.9	....	....

Wages — Average Weekly Earnings

Month	1945 All Rubber Products	1945 Rubber Tires & Tubes	1946 All Rubber Products	1946 Rubber Tires & Tubes	1947 All Rubber Products	1947 Rubber Tires & Tubes
Jan.	$54.49	$64.29	$46.71	$50.29	$54.03	$59.78
Feb.	54.40	64.04	46.05	49.21	54.06	59.90
Mar.	50.62	57.29	46.46	49.72	52.97	58.05
Apr.	51.93	59.75	49.67	54.77	55.23	61.64
May	50.09	57.32	49.82	54.72	55.30	61.12
June	51.45	59.20	50.45	54.82	55.49	61.35
July	51.81	59.59	50.60	56.11	55.74	62.06
Aug.	46.76	52.81	51.03	55.42	55.55	61.29
Sept.	47.20	53.59	53.69	59.89	57.32	63.80
Oct.	45.57	49.48	51.74	57.38	....	....
Nov.	44.68	47.78	52.93	58.87	....	....
Dec.	45.48	48.54	54.63	60.46	....	....

Wages — Average Hourly Earnings

Month	1945 All Rubber Products	1945 Rubber Tires & Tubes	1946 All Rubber Products	1946 Rubber Tires & Tubes	1947 All Rubber Products	1947 Rubber Tires & Tubes
Jan.	$1.151	$1.317	$1.121	$1.255	$1.330	$1.511
Feb.	1.149	1.314	1.129	1.266	1.331	1.517
Mar.	1.117	1.260	1.138	1.275	1.330	1.512
Apr.	1.136	1.294	1.232	1.414	1.397	1.608
May	1.132	1.284	1.266	1.446	1.416	1.622
June	1.140	1.307	1.283	1.461	1.419	1.615
July	1.138	1.296	1.292	1.472	1.445	1.640
Aug.	1.119	1.269	1.295	1.474	1.448	1.641
Sept.	1.098	1.243	1.323	1.507	1.450	1.661
Oct.	1.100	1.231	1.313	1.492	....	....
Nov.	1.112	1.249	1.322	1.503	....	....
Dec.	1.113	1.247	1.331	1.513	....	....

Hours — Average Weekly Hours per Worker

Month	1945	1946	1947	Month	1945	1946	1947
January	47.3	41.7	40.6	July	45.5	39.2	38.6
February	47.3	40.8	40.6	August	41.8	39.4	38.4
March	45.3	40.8	39.8	September	43.0	40.6	39.5
April	45.7	40.3	39.5	October	41.4	39.4	...
May	44.2	39.4	39.0	November	40.2	40.1	...
June	45.2	39.3	39.1	December	40.9	41.2	...

Source: U. S. Department of Commerce.

Indexes of Production, Shipments and Inventory For The Rubber Industry

Production 1935-1939 = 100 (Based on man-hours)

Month	1945	1946	1947	Month	1945	1946	1947
Jan.	247	215	247	July	218	211	207
Feb.	247	216	246	Aug.	193	221	209
Mar.	236	221	239	Sept.	172	234	216
Apr.	233	219	234	Oct.	191	234	220
May	224	215	220	Nov.	192	243	...
June	222	218	216	Dec.	205	252	...

Shipments—Average Month 1939 = 100 (Based on $ Value)

Jan.	311	229	290	July	274	268	289
Feb.	351	242	315	Aug.	255	282	300
Mar.	351	260	322	Sept.	200	311	...
Apr.	356	282	311	Oct.	260	333	...
May	333	288	300	Nov.	212	313	...
June	333	293	312	Dec.	292	352	...

Inventory — Average Month 1939 = 100 (Based on $ Value)

Jan.	170.6	173.7	238.0	July	183.3	195.0	272
Feb.	176.7	179.9	250.0	Aug.	182.4	198.0	262
Mar.	175.5	186.4	262.0	Sept.	177.4	204.0	....
Apr.	175.3	198.5	273.0	Oct.	167.7	212.0	....
May	178.3	195.5	282.0	Nov.	167.1	215.0	....
June	178.7	192.4	281.0	Dec.	169.0	216.0	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1940	1941	1942	1943	1944	1945	1946
Asphalt [a]							
Short tons	22,772	20,536	22,263	16,510	20,189	19,483	28,715
% of total	0.9	0.6	0.6	0.5	0.6	0.5	0.7
Barite (Barytes):							
Short tons	4,283	9,800	6,334	8,000	10,000	10,000	20,000
% of total	2.3	4.2	3.6	3.9	2.9	2.1	4.4
Carbon Black:							
Short tons	155,090	219,751	147,974	236,737	369,015	402,193	470,732
% of total	58.5	68.2	65.8	75.2	78.7	78.9	74.1
Clay, Kaolin:							
Short tons	92,640	127,055	51,334	50,964	59,588	109,936	162,393
% of total	11.1	11.6	5.1	5.5	6.8	11.7	12.3
Clay, Fire & Stoneware:							
Short tons	10,104	9,000	5,000	10,259	7,160	7,800	12,951
% of total	0.4	0.2	0.1	0.2	0.1	0.1	0.2
Lead Sulfate, Basic:							
Short tons	128	200	89	131	268	200	.....
% of total	2.1	1.9	1.1	2.3	4.2	5.2	.....
Lime:							
Short tons	1,879	3,058	1,381	2,039	5,634	7,170	3,193
% of total	0.03	0.05	0.02	0.05	0.13	0.10	0.1
Litharge:							
Short tons	1,590	3,968	3,460	4,302	3,023	1,864	2,131
% of total	1.8	3.3	3.8	3.8	2.2	1.3	1.6
Lithopone:							
Short tons	3,387	3,547	1,047	1,078	726	977	1,607
% of total	2.2	2.0	0.8	0.8	0.5	0.7	1.1
Mica, Ground:							
Short tons	1,731	3,476	1,754	3,063	1,137	3,715	4,951
% of total	6.2	8.0	3.7	6.0	2.2	7.0	10.6
Sulfur:							
Short tons	54,000	63,000	40,000	51,000	63,000	64,960	72,800
% of total	2.5	2.4	1.4	1.8	1.9	2.0	2.2
Talc [b]							
Short tons	28,501	58,114	40,487	48,994	51,833	63,758*	65,980
% of total	10.0	13.9	10.0	11.8	13.0	16.0	14.4
Zinc Oxide:							
Short tons	70,979	90,429	52,717	67,898	59,518	63,447	83,776
% of total	62.8	63.4	53.0	47.4	42.3	49.6	53.1

([b]) Includes pyrophyllite and ground soapstone. * Revised.

Source: U. S. Bureau of Mines.

Notes: ([a]) Solid and semi-solid products of less than 200 penetration.

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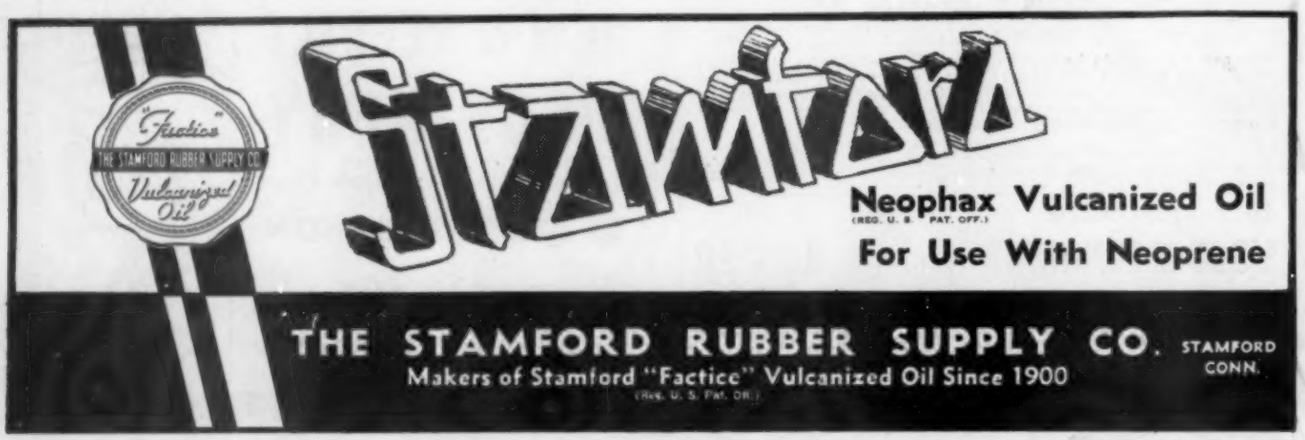

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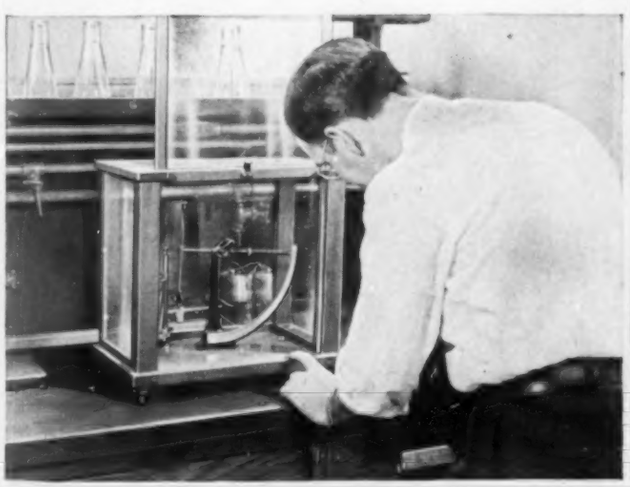

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